THE IRON AGE DIRECTORY

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THE IRON AGE

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SEE PAGE 26

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THE IRON AGE

New York, Thursday, June 10, 1909.

A Novel Belgian Inclined Elevator.

BY DR. ALFRED GRADENWITZ, BERLIN, GERMANY.

An ingenious inclined elevator was recently installed at the works of H. Bollinckx at Brussels, Belgium, to handle work between two parts of the shops at different levels. Previously the work has been transported over the existing incline, but it entailed much loss of time, which was felt to be a serious drawback. Owing to the considerable length and unequal distribution of weight of the objects to be transported, the use of an ordinary elevator was out of the question and finally the unique transporter shown in the accompanying illustrations was adopted. Fig. 1 shows the elevator at the bottom of its travel and Fig. 2 the elevator at the top with a load.

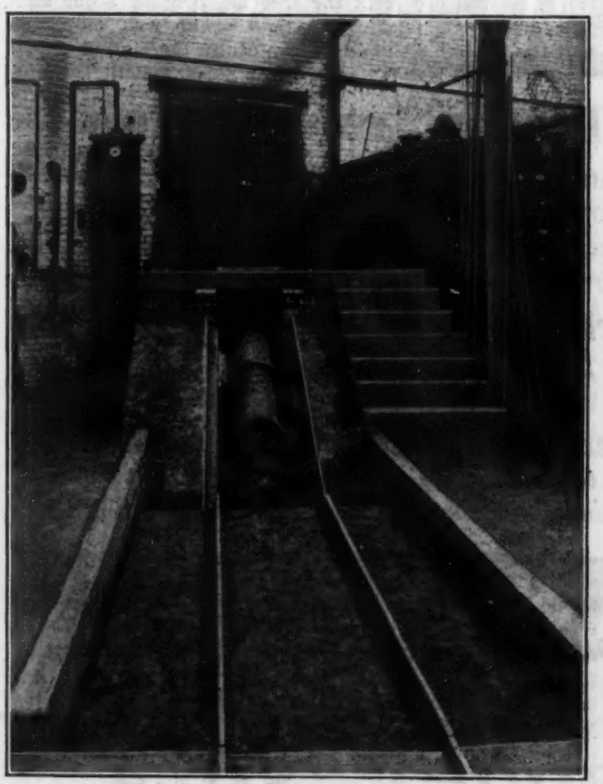


Fig. 1.—Elevator Down.

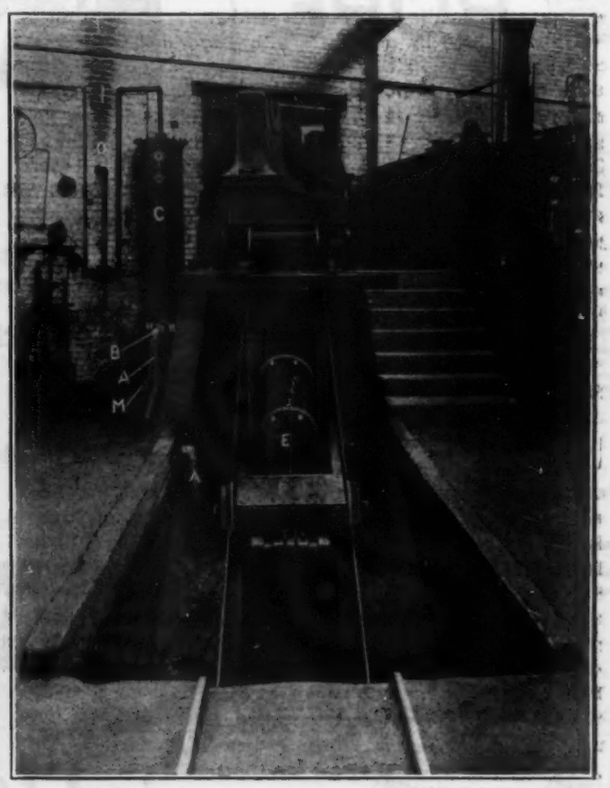


Fig. 2.—Elevator Up.

An Inclined Pneumatic-Hydraulic Elevator in the H. Bollinckx Works, Brussels, Belgium.

The truck P, running on the incline, as seen in Fig. 2, is of a considerable length, so that its smooth working is not interfered with by one sided loads nor by the carrying of lengthy machine parts. The power for operating the truck is supplied by a hydraulic cylinder, E, supplied with water under pressure from the receiver C, situated close to the wall. The connecting pipe A contains a valve, B, which is generally kept closed, so that the truck stands wherever it is stopped. This is of special importance on the arrival of loaded trucks at the upper terminal, the truck being prevented from descending. The receiver communicates with the compressed air supply of the works, as shown at F, which acts to put the water in the receiver under pressure when required.

When the truck has arrived at the upper terminal and it is desired to return it the compressed air is allowed to escape from the receiver at O, and then by opening the valve B between the cylinder and receiver by lifting the counterweight M from the valve lever the water can flow back into the receiver, allowing the elevator to descend. The truck descends in about 30 sec. On its arrival at the lower terminal the operator drops the counterweight, thus closing the valve. He may then reopen the air cock, which places the water in the receiver again under pressure, but as the water is unable to pass from the receiver to the cylinder the elevator will not move until the valve B is again opened.

Steel Companies Exchange Property.—An exchange of mill property has been arranged recently between the United States Steel Corporation and the Republic Iron & Steel Company. In the Youngstown, Ohio, District the Steel Corporation, through its subsidiary, the National Tube Company, owned a tract of about 15 acres at Haselton, formerly occupied by the American Tube & Iron Company. The mill was dismantled some time ago and there remained on the site only buildings and railroad tracks. At South Sharon, Pa., the Republic Iron & Steel Company had a tract of about the same size as the above, once occupied by its Kimberly mill, abandoned several years ago. The transfer of the respective tracts makes it possible for the Republic Iron & Steel Company to round out its property at Haselton and gives it additional water front, which will be of advantage in the extensions it contemplates in the construction of a tube mill and in the probable addition at some time of an open hearth plant. The acquisition of the South Sharon property gives the Steel Corporation a solid block of land in connection with the plants acquired some years ago from the Union Steel Company.

The annual meeting of stockholders of the Orient Coke Company held at Uniontown, Pa., last week, the following officers were elected: Julian Kennedy, president; Robert Bentley, vice-president; Reid Kennedy, secretary and treasurer; R. M. Frey, assistant secretary and treasurer; O. W. Kennedy, general manager.

Higher Rates for Iron and Steel.

Proposed Amendments to the Senate Tariff Bill in That Direction.

WASHINGTON, June 8, 1909.—Notwithstanding the protracted debate on the textile schedules, excellent progress in the consideration of the tariff bill has been made in the past week, and Chairman Aldrich of the Finance Committee predicts with much confidence the final passage of the bill, after action by the Conference Committee, by July 1. But few provisions of the bill except its administrative features now remain to be acted upon, and practically all the set speeches of its advocates and opponents have been delivered, so that in default of a regularly organized filibuster, of which there is now no evidence whatever, the early passage of the measure seems certain.

Higher Rates Sought for Iron and Steel.

The success that has followed the efforts of the Finance Committee to maintain the Dingley rates on several of the leading schedules which have been most sharply assailed by advocates of reduction has tempted certain interests in the iron and steel industry to urge a revision of the comparatively heavy cuts made in the metal schedules by the Ways and Means Committee and approved with more or less modification by the Finance Committee. It has been rumored this week that before the final vote on the bill the rates on steel rails, structural steel and other forms would be increased by at least one-half the cut made by the Finance Committee, and that other minor changes in the nature of readjustments would be made in the rates on certain more highly finished products. In this connection it is pointed out that Chairman Aldrich, in discussing the metal schedule on the floor of the Senate, declared that he had assented to the reductions made by the Finance Committee with great reluctance and that he feared a very serious error had been made by the committee which would be discovered too late, and which would deal a heavy blow to a great industry. Senator Aldrich's statement has been used with considerable effect by the advocates of higher duties in the metal schedule, and there is reason to believe that the question of increases rests solely with the Finance Committee, and that the same majority which has been marshaled by Senator Aldrich in favor of every rate proposed by the committee will be found to favor any change in the metal schedule that may be reported. The committee has made no decision in regard to increases, and reports to the contrary are at least premature.

The Duty on Ferroalloys.

The status of the ferroalloy controversy continues to attract attention here and throughout the steel industry. The rates adopted by the House were regarded by some steel makers as inordinately high and many protests were lodged with the Finance Committee. The so-called independent manufacturers were a unit in their demand for lower duties, and at one time they seemed to be in a fair way to control the situation. The domestic alloy producers, however, developed an astonishing amount of influence with the Senate Committee and the rates as finally reported to the Senate were wholly unsatisfactory to the steel makers. The report is now current that when the bill reaches conference "substantial reductions" will be made and that the steel makers will have no fault to find with the bill as finally enacted. Unprecedented things are accomplished almost daily in national legislation, but if rates on ferroalloys satisfactory to the independent steel makers are secured in conference a precedent of half a century's standing will have been shattered. It is an iron rule governing conference committees that they shall take the House and Senate provisions as representing the extremes of dissent and that the conference agreement shall be in the nature of a compromise. Taking the case of ferroalloys as an illustration and applying this rule, it is difficult to see how the steel makers can be satisfied with a rate which shall be a compromise between the Senate and House figures when both schedules are regarded as being far above a fair level. It would seem that the steel producers have accepted assurances which either do not proceed from authoritative sources or which have been misinterpreted and that the final action of the Conference Committee will prove a serious disappointment. There has been much curiosity to learn the exact attitude of the Steel Corporation with respect to the ferroalloy duties. While no positive information is available, there is authority for the statement that it has manifested very little interest in the matter and appears to be indifferent as to the prices its competitors may pay for any of the iron alloys.

Support for the Iron Ore Duty.

The prospect that when the tariff bill is reported from the Committee of the Whole to the Senate a separate vote will be demanded on iron ore for the purpose of "putting on record" Senators who favor such a duty lends a special interest to a statement made on the floor during the past week by Senator Stone of Missouri, one of the Democrats who voted for the rate of 25 cents per ton. In explaining his reason for advocating the removal of iron ore from the free list Senator Stone said that after painstaking investigation he was convinced that the available supply of iron ore in the United States is sufficient to last for several centuries, and that, therefore, there is no force in the contention that ore should be admitted free in order to conserve our resources. Taking up the second argument against the duty, based on the assertion that the Steel Corporation favored the tax because of its control of enormous areas of land containing iron ore, in consequence of which it practically held a monopoly of the American supply, Senator Stone said he had received satisfactory assurances that the statement that the corporation controlled even 50 per per cent. of the iron ore lands was "a gross exaggeration." Concerning the general statement that the Steel Corporation favored a duty on iron ore, he said that he had found no evidence to that effect; that neither he nor any of his Democratic colleagues, so far as he could ascertain, had received any representations indicating its desire in the matter, and that he refused to be "stampeded at the mere specter of an alleged monopoly."

Referring to the iron ore deposits of Cuba and the desirability from the standpoint of certain tidewater steel producers to obtain this ore duty free, Senator Stone said that he understood that the bulk of these ores were owned by the Bethlehem and Pennsylvania Steel companies; that Mr. Schwab was the head of the Bethlehem Company and had been "educated in the iron and steel industry under the tutelage of Andrew Carnegie." Mr. Schwab's connection with the Steel Corporation had never been wholly severed, he believed, and he added that he had "little or no doubt that when Mr. Schwab's Cuban mines begin to empty their ores into our markets the trust will share with the Schwab company in whatever benefits may accrue." Whatever fallacies there may be in Senator Stone's reasoning, there is good ground to believe that every one of the 18 Democrats who supported a duty on iron ore in Committee of the Whole, if called upon to do so, will vote in the Senate to retain that duty.

President Taft's Attitude.

Perhaps the most interesting question now being considered by the members of the Senate and House is the attitude of President Taft with respect to the tariff bill and the interpretation that he will put upon the ante-election pledges of his party with respect to tariff revision. Up to the present time the President has consistently refrained from interfering in any way with the framing of the bill. In marked contrast with the policy of his predecessor, he has told a hundred callers that it is the function of Congress to enact laws and of the Executive to enforce them, and that while he recognizes his responsibilities and his duty to make recommendations in the interest of the public welfare, he does not conceive it to be proper or wise for him to take an active part in the work of framing the pending bill. That he sympathizes with the House leaders in their efforts to pass a tariff law, the general characteristic of which shall be revision downward, may be gathered

rather from his private conversation with friends than from anything he has said to the leaders of either House. The suggestion has been heard in certain quarters that when the bill is sent to conference the President will summon the conferees of both houses and outline to them his views as to the form the bill should finally take. If this is his plan, he has given no inkling of it to any one in authority.

The Charge That Rates Have Been Raised.

Concerning the general impression that the Finance Committee has materially raised the rates of the present tariff law, which is supported to some extent by figures showing an increase in the average ad valorem rate of certain schedules, it is pointed out by the committee experts that these figures are often misleading, especially in view of the basis of the calculations which, in estimating the rates on any given schedule, fails to take into account the items allied with that schedule which have been placed on the free list. Taking the metal schedule as an example, it is an interesting fact, of which very few persons seem to be aware, that the action of the House in transferring iron ore to the free list operated to raise the average ad valorem of the metal schedule instead of lowering it. A moment's thought, however, makes the matter entirely clear, for it is obvious that if any product, the rate on which is less than the average rate of the schedule, be removed from the schedule the average of the remaining items must be higher than before.

Deceptive "Ad Valorem" Rates.

It is also a fact that the placing of practically prohibitory rates on certain items operates to reduce the average ad valorem, for the reason that in making up the average each rate is "weighted" by the amount of importations. It is obvious, therefore, that a rate of 100 per cent., for example—such a rate being practically prohibitory—would be a comparatively negligible factor in computing the average, while a rate of 50 per cent., under which the importations might be very large, would be of prime importance, as such a rate would be above the average of the schedule. The fact must also be borne in mind, in considering the Finance Committee's action, that Senator Aldrich and his colleagues expect to be obliged to make important concessions to the Ways and Means Committee in conference. While, because the House drafted the bill in its entirety and the Senate has accepted a large part of the measure without modification, it may be assumed that the Senate will have its way with respect to the greater part of the amendments it has made, nevertheless the House rates on many items will ultimately be conceded, and in many other cases compromise rates will be adopted. As already intimated with respect to ferroalloys, the final rates on all items will be either those fixed by House or Senate or rates between those extremes. Nothing higher or lower than the two extremes is likely to be agreed upon.

The New Drawback Section.

The Finance Committee has again changed its plans with regard to the framing of a drawback section. The last announcement made in this connection was to the effect that the committee would present no provision, and that the text would be formulated in conference on the basis of the section adopted by the House, which it was said would be amended by the elimination of the so-called substitution clause, which would be replaced by the text of Section 30 of the Dingley act, slightly modified for the purpose of liberalizing the interpretation of the term "manufactured" as heretofore construed by the courts. Senator Aldrich during the past week has announced, however, that the Finance Committee has found it desirable to frame a comprehensive drawback section for the purpose of forestalling the objections of certain Senators who oppose the payment of drawbacks on certain commodities, including flour and oil cake made from imported seed. The opponents of a drawback on tin plate do not appear to have made a very deep impression upon the committee, which is disposed to extend rather than narrow the scope of the general provision.

The substitution feature of the House bill, modeled on the French law, has been abandoned by the Senate Committee because of the conviction of Senator Aldrich and his colleagues that in practice it would imperil the revenues because of the opportunities for fraud which it would afford. It is proposed, however, that the new provision shall grant drawback on many articles "produced" in the United States from foreign materials which cannot with technical accuracy be described as "manufactured." The opponents of drawback on flour, oil cake, &c., will be placated by the insertion of a provision requiring imported grain, seeds, &c., to be treated within a reasonable distance of the port of entry and the resulting products exported within a certain specified period of time after importation.

The Senate drawback section will embrace those features of the House provision granting drawback of duty paid on the materials used in the manufacture of goods intended for consumption on shipboard, a modification in the present law rendered necessary by the decisions of the courts to the effect that goods consumed as ships' stores, even if limited to those sold to vessels in the foreign trade, are not "exported" within the meaning of the law and therefore are not entitled to drawback of customs duties or rebate of internal revenue tax.

The Maximum and Minimum Clause.

The maximum and minimum clause of the Senate bill promises to give the Finance Committee leaders no little trouble, and in estimating the length of time that will be consumed in the further consideration of the measure a liberal allowance is made for the discussion of this provision. Much is being made by the critics of the Senate measure of the fact that while the House bill provides for the imposition of retaliatory rates equal to 20 per cent. of the general tariff, the Senate clause adds 25 per cent. ad valorem. At first glance there would seem to be a difference of but 5 per cent., but a single illustration will show a much wider margin. An article bearing a rate of 50 per cent. under the general tariff would be raised by the House bill 20 per cent. of that rate in the event of retaliatory action, making a total of 60 per cent. Under the Senate bill the same article would be increased 25 per cent. ad valorem, which, added to the general tariff, would give a retaliatory rate of 75 per cent. The Finance Committee members defend the Senate provision on the ground that it is intended to be practically prohibitory on articles bearing relatively high rates, and it is further pointed out that, while under the House bill the retaliatory rates would apply automatically and probably in many cases to the disadvantage of the United States, under the Senate measure it would at all times be discretionary with the President as to whether they should be invoked.

Income Tax Proposition Dead.

The proposition for an income tax, which has aroused renewed interest during the past week by the presentation of another income tax amendment by Senator Cummins of Iowa, has received something of a setback in the announcement that the annual estimates to be submitted to Congress in December, which are now being made up by the several departments, have been heavily cut, the grand total being reduced by more than $50,000,000. Senator Cummins' amendment proposes a tax of 2 per cent. on the incomes of all individuals and corporations in excess of $5000 and is a more conservative measure than any of those thus far presented in either House; nevertheless, it will probably be referred, with all other provisions of like character, to the Senate Judiciary Committee with instructions to investigate the constitutionality of the taxing of incomes by the Federal Government and to report a measure for that purpose in the event that it shall appear after a reasonable length of time that the new tariff law will not provide sufficient revenue.

The budget for the new fiscal year, as made up by the administration, shows a cut of approximately $30,000,000 in the army, $10,000,000 in the navy, $8,500,000 in the Interior Department and about $11,500,000 in the other departments and independent bureaus. As these estimates will probably be still further reduced by Congress, there is a fair prospect that Senator Aldrich's calculations respecting the adequacy of the revenues to be derived under the new tariff law will be realized.

W. L. C.

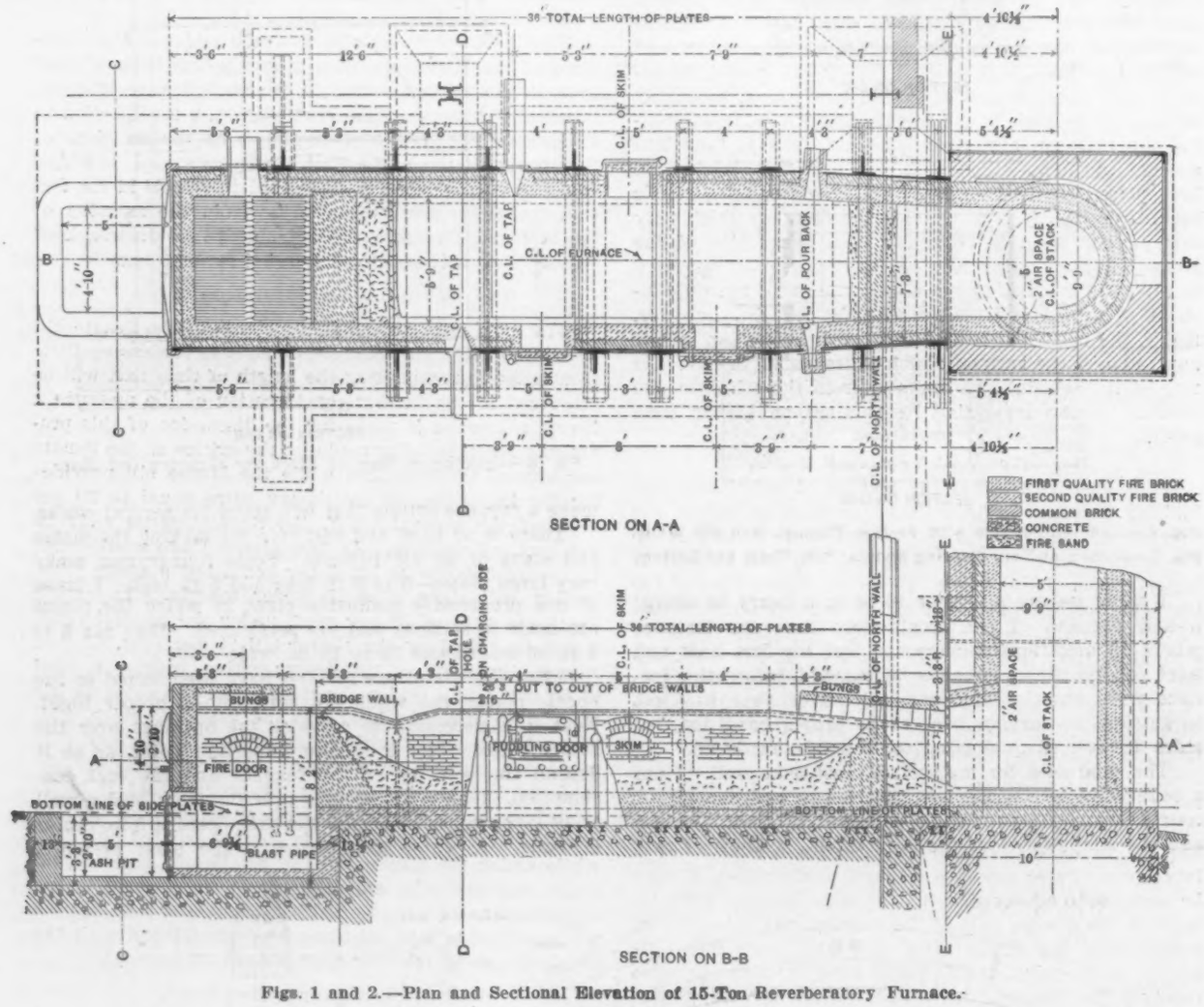
Air Furnace Construction for Malleable Castings.*

BY W. H. KANE, ZANESVILLE, O.

The principal use in melting practice in this country of the reverberatory furnace, commonly called the "air furnace," is for the production of malleable castings. There is a type of this furnace which finds its application for high class gray and chilled iron work, but its construction differs materially from what is required in small casting practice where extremely hot iron must be had. The air furnace may not be the cheapest producer, for the cupola is far ahead on that score, but the inferior quality of castings made with a direct contact of fuel and metal more than offsets the greater cost of air furnace malleable castings. On the other hand, the open hearth furnace, if it can be run continuously, is cheaper than the air furnace and produces a slightly higher grade of metal, but it has its disadvantages and can only find its proper place in the very large works.

There is nothing like the air furnace for convenience. You can run heats up to the blowing of the whistle at night, take off the bungs, put in new walls or bottom (when this breaks and comes up), and be ready to charge again when the whistle blows in the morning. No time has been lost and the furnace is as good as ever.

After an air furnace has been built I have always found it best to put in a slow fire, without any blast, for a few days. This slow fire dries out the walls and bungs, as well as the stack. Further, the side and buckle plates have a chance to become heated up and will not crack so easily afterward. The bungs may now be taken off and the silica sand bottom put in and baked hard.



Figs. 1 and 2.—Plan and Sectional Elevation of 15-Ton Reverberatory Furnace.

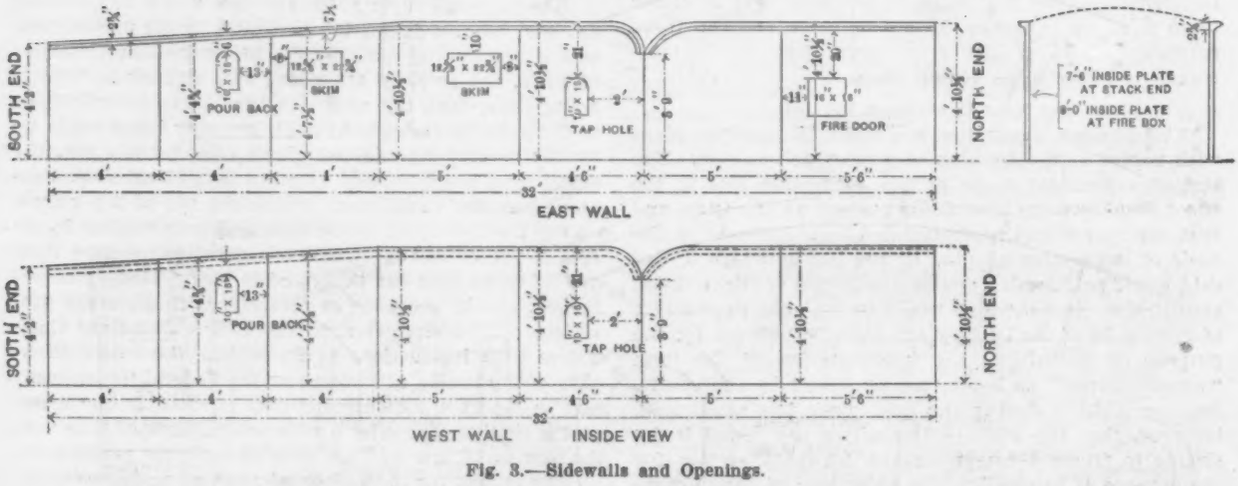


Fig. 3.—Sidewalls and Openings.

* Read at the Cincinnati convention, May, 1909, of the American Foundrymen's Association.

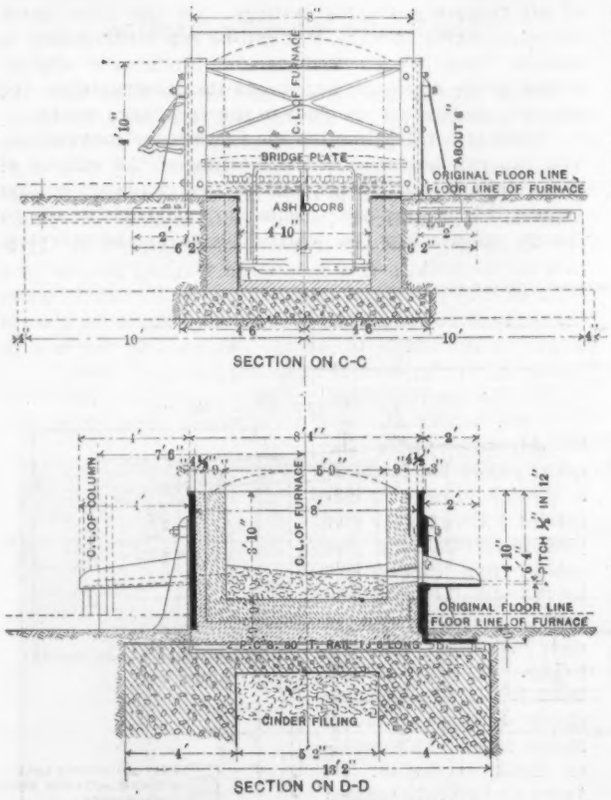


Fig. 4.—Back of Furnace with Section Through Ash Pit Walls.
Fig. 5.—Section at Tap, Showing Spouts, Side Walls and Bottom.

I think we are all prone to be in a hurry to charge a new furnace. I can recall more than one instance where an ambitious foundryman lost his first heat and hurt several others because he charged before the furnace was properly dried out. Moreover, time was lost in getting the furnace back to its proper condition, besides the loss in production could not be made up.

The sand used for the bottom must bake well. I am a believer in getting the best that can be had, though, of course, foundrymen must be governed by their location and the adaptability of the local sands. I know of several plants in which lake sand is used entirely and with good results. Old firebrick ground up and run through a No. 4 riddle, when mixed with sharp sand, will make an excellent bottom. Ground firebrick and fire clay mixed up for a daubing for side walls and spout, and to make the breast, give about the best results in that line. The same mixture is used for lining hand and bull ladles. Old grindstones, pulverized fine and rammed down hard, make a furnace bottom that will stand for several weeks.

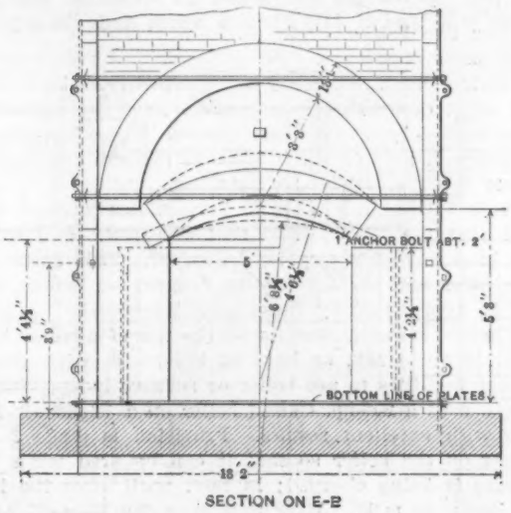


Fig. 6.—Opening in Rear of Stack for Cleaning Out Slag.

There is no hard and fast rule for making the plates and stays of an air furnace. Some foundrymen make very large plates—6 to 8 ft. long and 5 ft. high. I know of one progressive malleable plant in which the plates are made in sections and are perforated. They are 3 to 4 ft. in length and 12 to 18 in. wide.

After the plates are set and have been bolted to the buckle plates the walls are built to the proper hight. Next it is necessary to consider the openings over the bridge walls. This is a most important point, as on it depend the working of the furnace and the coal consumption. I have the opening over the front bridge wall at 18 in. center of bung and the back opening 6 in. center of bung. A water gauge records the blast pressure,

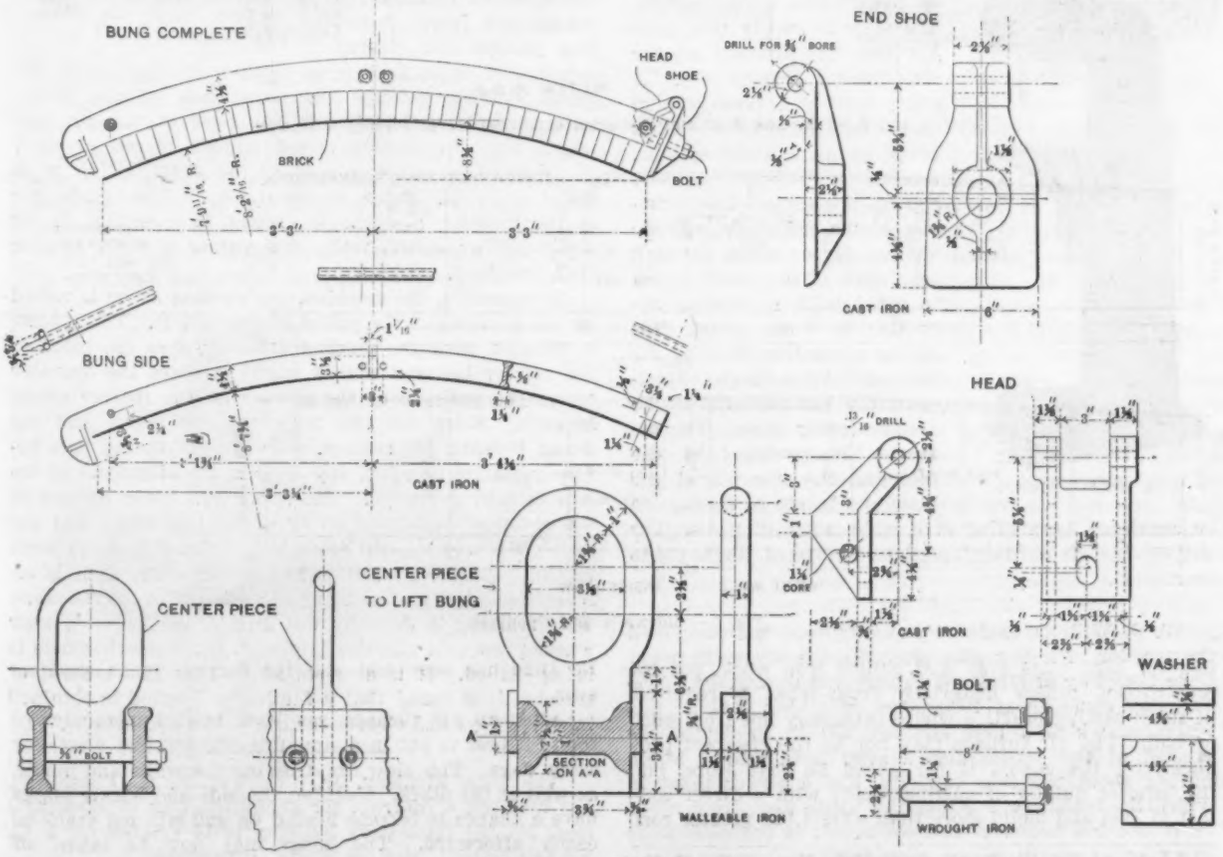


Fig. 7.—Details of Bungs.

which with about 3 in. and the openings above mentioned gives me good results. A higher blast pressure melts more rapidly but cuts out walls and bungs faster.

The grate should be at least 12 in. below the door, so that a bed can be carried from 12 to 16 in. in depth. The bungs for an air furnace are very much a matter of taste with the builder or foundryman. There are various styles in use. One has a single brick, or 9 in. Another takes a brick and a half, or 13 in., and still another two bricks, or 18 in. in width. The frame is made in various ways. The old style had rods running the entire length and could be tightened from both ends. The latest designs work better and have the tightening accomplished by means of set screws. These bungs rarely drop out, holding the brick well through the various phases of expansion and contraction.

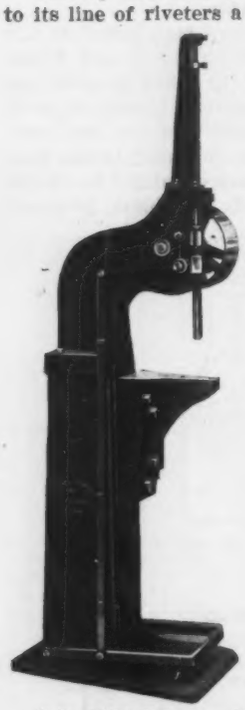
It is further advisable to have a heavy sheet iron hood over the fire door, so that the smoke and fumes that blow out of it may be drawn off. This keeps the air clearer and healthy for the foundry—a benefit that will be appreciated by those most interested.

Finally, I would recommend the use of a waste heat boiler in the stack, or back of the stack, with proper damper facilities to use boiler or furnace independently. I have used a 250-hp. Cahall boiler on a 12-ton air furnace with excellent results. Provision is made for a firebox on the boiler so that it can be fired while the furnace is being charged; in fact, until after the iron has begun to melt. After that time the blow-off valve of the boiler will be working and needs looking after.

The accompanying cuts show details of construction of an air furnace of 15 tons capacity.

The Hubbell 3-8-In. Riveting Machine.

Harvey Hubbell, Inc., Bridgeport, Conn., has added to its line of riveters a ⅜-in. machine, which, while similar in principle to the smaller sizes, is much heavier and is designed for use on rivets up to and including 7-16 in. diameter. In a majority of lines of metal goods manufacturing there is a demand for a device for riveting two or more parts on an article, and it is to supply this market that the Hubbell riveter has been brought out. A shaft driving a three-pointed star wheel engages a lifting block on an upright spindle, forcing it upward against spring pressure. The hammer at the end of the spindle strikes three blows to each revolution of the shaft, which is fitted with a friction actuating a worm gear, thus giving a rotating blow to the hammer. By a simple adjustment the hammer will strike a nonrotating blow. The operation is governed by the foot and the strength of the blow and length of stroke can be regulated, permitting of a wide range of work. The output depends entirely upon the nature of the parts to be riveted.



⅜-In. Hubbell Riveter.

W. G. Wilkins, engineer and architect, has completed the erection of a new coke plant for the Mount Pleasant Coke Company at Hecla, Westmoreland county, Pa. The company owns about 1000 acres of coking coal at this place, on which a new airshaft 290 ft. in depth was erected at the outset, also a steel head frame, a bin having about 800 tons capacity, and a power plant in which the boilers will utilize the waste heat from about 50 of the 100 bee-hive coke ovens. It is probable more ovens will be built in the near future.

The Hoefer Reaming Machine.

Many special machines and devices have been designed and built by the Hoefer Mfg. Company, Freeport, Ill., for use in the manufacture of its line of drill presses. The reaming machine herewith illustrated is a new addition and was designed to overcome the troubles the company has encountered in the manufacture of spindle sleeves, pulleys and other parts of drill presses. It is difficult to obtain a true hole when reaming is done in a lathe or drill press, and this difficulty is augmented when the parts to be reamed have chambered holes, for then it is almost impossible to get the two ends of the hole to line up perfectly, even if a floating reamer is used.

In this reaming machine the company has taken the base and column of one of its standard 16-in. drills, and to the base under the metal shield has fastened a special bracket which carries a crown gear and pinion transmitting the power from the pulleys to the spindle head, the drift hole of which is seen just below the cone pulley. Into this spindle head is placed a reamer shank having a No. 3 Morse taper. This reamer shank carries an adjustable shell reamer which can be adjusted so that a standard size hole is maintained at all times, and ends just above the reamer in a small pilot which enters into the guiding arbor above it. This guiding arbor is held in the long ways of the rotating spindle carried by the column. On the back of the spindle is cut a rack in which the cross spindle operates through the wheel and lever shown. The pulleys and sleeves are drilled in a drill press with a special cutter bar which extends through the cored hole of the sleeve, into a revolving bushing in the base of the jig, and which has two double ended cutters placed about 1 in. apart, one cutter roughing, the other sizing it to about 0.010 in. under standard size. The guide bar in the reaming machine is ground to a sliding fit for the pulley or sleeve, while the reamer is 0.001 smaller than standard.

A Reaming Machine Built for Its Own Use by the Hoefer Mfg. Company.

In operating the machine, the guiding arbor is raised by the spindle and the pulley is slid onto it. The spindle is lowered until the guiding arbor engages the pilot on the reamer bar and with a slight pressure the operator forces the pulley over the reamer on the reamer shank beneath. Since the two bars, the one above and the shank beneath the reamer, quite closely fit the hole before and after reaming, any error in the alignment of the hole is fully corrected. The upper and lower corners of the reamers are stoned off by a small oil stone and the result is a very smooth hole. It is claimed that the work turned out by the machine is very accurate, as it is almost impossible to detect any variation with micrometers. This reaming is done by the drill press operator, near whose press this machine is placed, while another hole is being drilled. It is also stated that by this method of reaming it is found that a far better bearing is obtained in the pulleys and sleeves for the shafts and spindle.

The John Eichleay, Jr., Company, S. S., Pittsburgh, has received a contract for about 100 tons of structural steel for the three-story building to be erected for a St. Francis' school, McKees Rocks, Pittsburgh.

The Lemley Friction Clutch.

The accompanying engravings illustrate the Lemley friction clutch, the invention of F. J. Lemley, 142 West North avenue, Chicago, Ill., for whom it is manufactured by the W. H. Jones Foundry & Machine Company, 800 Noble street, of the same city. Fig. 1 shows a section of the clutch as applied to a pulley; Fig. 2 a section of a clutch applied in a shaft coupling, and Fig. 3 an exterior view of the clutch. The clutch has few parts and joints and is claimed to have a strong grip, with every part strong enough to retain the grip. The center plate or friction disk is shod with hard maple segments, which are riveted to each side of the disk, making a complete friction surface around the plate.

The wood to iron contact for friction is considered to have many advantages. The iron surface will not wear or get out of shape, and as the wear is all in the blocks, a better contact is obtained. This results in a high coefficient of friction, low cost of repairs and no need for lubrication. When it is necessary to replace the wood segments the cap screws are taken out, while the friction plate is held in place. After the screws are

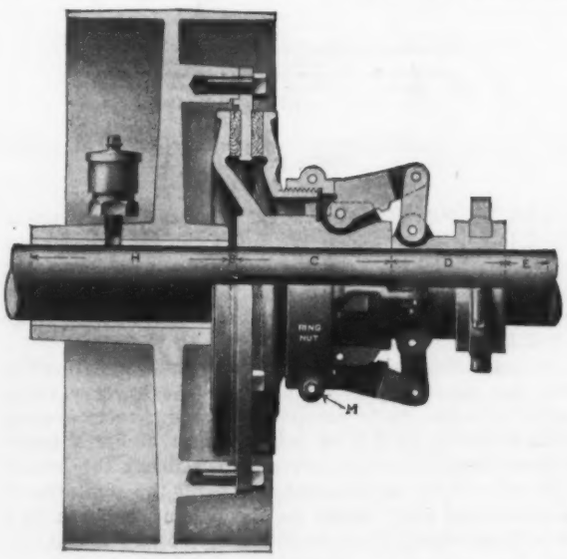


Fig. 1.—Sectional View of a Lemley Clutch Pulley.

removed the plate, which is split, can be taken out, and if the pulley is in the way it may be slid back to clear the plate. If the pulley cannot be moved the pins holding the toggles to the hub C can be taken out, and then the front plate and sliding collar moved out of the way and the friction plate taken out. One operation equally adjusts all toggles. The adjusting ring nut is threaded to fit the hub of the front friction plate. The ring nut is split and the bolt M clamps it to the hub of the friction plate. In making the adjustment the nut M is loosened and the ring nut is turned to the left to tighten the clutch and to the right to release it. After making the adjustment the nut M is retightened.

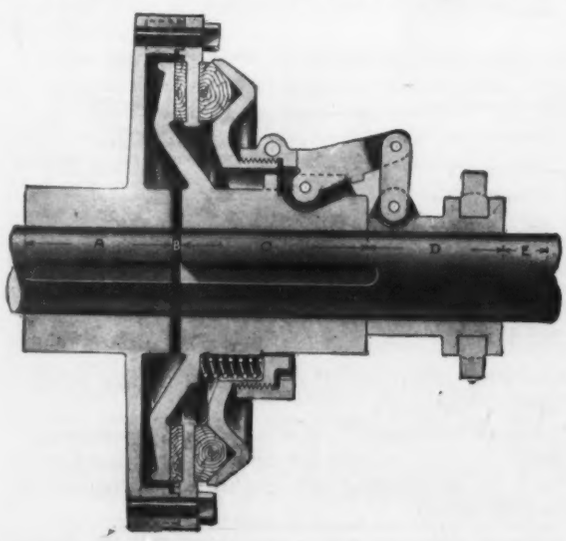


Fig. 2.—Sectional View of a Lemley Clutch Cut-off Coupling.

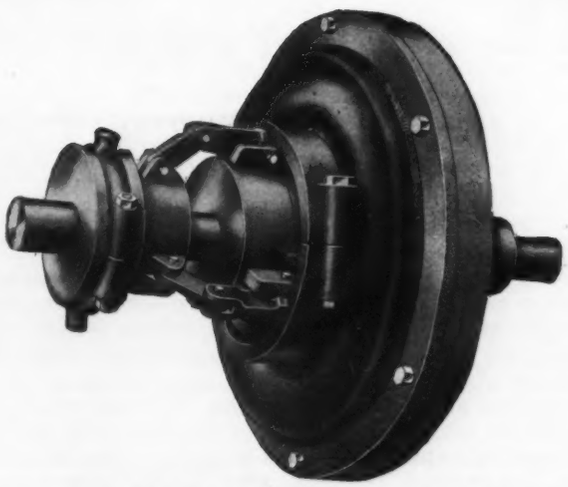


Fig. 3.—A Lemley Clutch with Sleeve to Which a Pulley, Gear, Sheave or Sprocket Can Be Keyed.

The springs shown in Fig. 2 separate the friction plates when the clutch is disengaged. The spring release is used to avoid a complicated and many jointed toggle arrangement. It is claimed that the springs will release the friction plates regardless of the speed and that they do not cause lost motion, but that a toggle arrangement with many joints has always been responsible for trouble in this respect.

The clutch coupling illustrated in Fig. 2 is the same as the clutch in Fig. 1, except the front friction plate. This is made V-shape in order to center the shafts should they not be centered when the clutch is disengaged. The clutch in Fig. 3 is provided with a sleeve to which a pulley, gear, sheave or sprocket can be keyed or clamped, giving substantially the same sort of an outfit as that shown in Fig. 1. The clutch couplings are made in 10 sizes, capable of transmitting from 3 to 100 hp. at 100 rev. per min., and the clutch pulleys with from 18 to 72 in. diameter pulleys and various widths of face transmitting powers to correspond and ranging from 4 to 120 hp.

A Record in Fan Building.

An instance of what can be accomplished by a sales department and factory organization working in harmony is afforded by a recent contract handled by the Buffalo Forge Company, Buffalo, N. Y. In connection with cold storage warehouses operated by the Pacific Fruit Express Company at Roseville and at Colton, Cal., eight large fans were required by the Pacific Engineering Company, San Francisco. Each fan was to deliver 44,500 cu. ft. of cold air, against a pressure of 3 oz. per square inch, and to be of the full housing type, with bearings supported on concrete piers, the blast wheels overhung on the shaft, and with stuffing boxes on the fan housings to prevent the leakage of air.

Although special in several particulars, the Buffalo Forge Company undertook to furnish these fans, each having 7-ft. wheels running at 380 rev. per min., and to ship four in 10 days and the balance 15 days later. As the entire shipment weighed 32,000 lb., the advantage in freight on account of shipping in one car would be considerable, and when the order was received by wire at the factory on April 19 it was decided to make a special effort to complete the eight fans in the time promised for the first four. Shop drawings were not started until receipt of the order, but preliminary notice was sent to the factory, and by the time the prints were received by the various departments on April 20 much of the material was ready. On the night of April 30, the tenth day after the order was received, the eight fans, with shafts, pulleys and outboard bearings, were loaded on a 42-ft. gondola and ready to start.

TURBO BLOWERS.*

Progress in Germany with Turbine Driven Rotary Air Compressors for Blast Furnace Service.

BY C. REGENBOGEN.

To obtain compressed air (other than in low pressure fan work) it was the practice until recently to employ reciprocating compressors. The application of rotating machines to compressor work became possible with the advent of steam turbines and high speed electric motors, with their high peripheral velocities. The first practical rotary air compressor was built by Rateau in 1906, and is interesting because, in addition to being a turbo compressor, it is driven by an exhaust steam turbine taking waste steam from reciprocating engines. This compressor delivers air at 105 lb. pressure, and has been in constant service since 1906. The compressor proper was built in four separate stages, with intercoolers between them, and consisted of two separate machines, each having a low pressure turbine and two stages of the compressor on its shaft. In addition, one side of the machine was equipped with a high pressure turbine, so arranged that in the absence of exhaust steam it could take high pressure steam and expand it through the low pressure turbine on the adjoining shaft. This machine under test in the works of Sautter & Harle, in Paris, delivered 3180 cu. ft. of free air per minute at a discharge pressure of 105 lb. gauge when running at 5000 rev. per min.

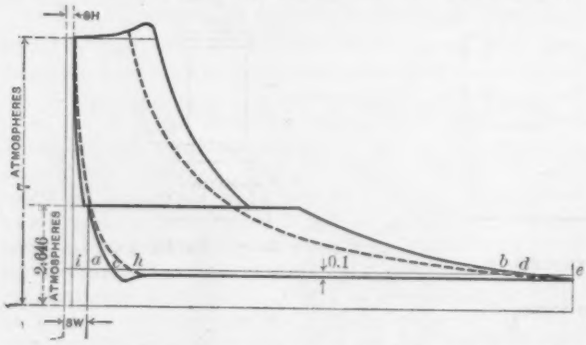


Fig. 1.—Theoretical Indicator Card for a Two-Stage Compressor.

Important Considerations in Comparing Turbo and Reciprocating Compressors.

One often finds in test reports of air compressors the expression "mechanical efficiency." This is the ratio of the diagram areas of the air and steam cylinders. Since compression in an air cylinder takes place along a line between the isothermal and adiabatic, it is natural that this efficiency is considerably higher than if it were referred to the work of isothermal compression, inasmuch as it takes into account only the loss between the two cylinders. In turbo compressors it is impossible to determine this efficiency, because it is impossible to take indicator cards from either the driving or driven machine. To compare the relative efficiencies of reciprocating and rotating compressors, it is necessary first to define an efficiency which will be equally applicable to both cases and which will serve as a basis for comparison. The best solution of the problem is considered the one that refers efficiency to isothermal compression, because this is the ideal to which our efforts are directed, and represents the minimum work that must be expended in compressing air (provided one does not cool below suction temperature). Only in cases where low discharge pressures prevail and no intercooling or jacketing is provided, in which cases compression follows almost exactly along the adiabatic, can one refer to adiabatic compression. A misunderstanding is impossible in either case if one definitely states the basis adopted.

Attention is called to another possible error. The thermal efficiency of an air compressing machine is determined by the relation between the heat energy represented in the compression cycle and the heat energy actually absorbed in the driving machine. A reciprocating engine works at its highest efficiency with a vacuum of say 25.5 in., while a turbine performs to best advantage at 28.5 and higher vacuum.

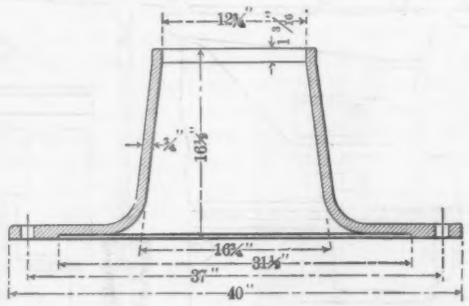


Fig. 2.—Nozzle with Orifice for Measuring Air Discharge Used at Rothe Erde.

In comparing the two types of machines on a thermal basis, one must unquestionably take the lower vacuum limit as a basis, as in exceptional cases a reciprocating engine referred to 25.5 in. might give a higher thermal efficiency than a turbine referred to 28.5 in.; this would not be fair, as the turbine makes possible the obtaining of the remaining heat energy in the steam (between 25.5 and 28.5 in. vacuum), while in an engine this is a direct loss.*

To avoid all possible error in determining the relative merits of the two systems, it is necessary to consider the question on the basis of production costs, which consist of steam consumption, cost of installation, depreciation, interest, upkeep, attendance, lubrication, relative condenser requirements, &c. Another source of difficulty arises in determining the air quantity discharged by the two types of machines. Here enters an uncertainty of the accuracy of the results given in published tests of reciprocating machines. It is pertinent at this point to go into the customary

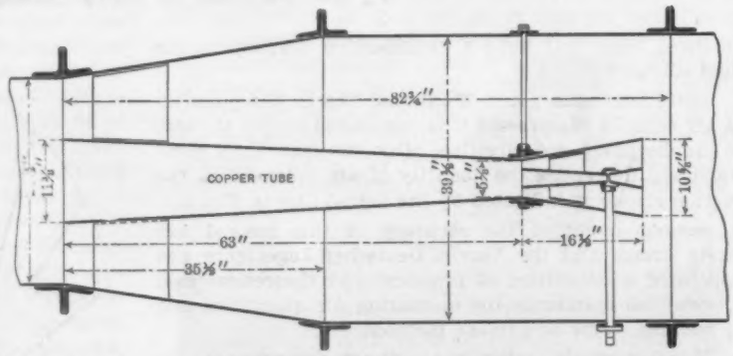


Fig. 3.—Compound Arrangement of Orifices for Air Measurement, Rateau.

Methods Employed in Measuring Air Quantities,

in order to later explain the methods that have to be pursued in establishing air quantities discharged by turbo compressors.

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Since the main point of interest lies in the quantity of air actually compressed it is considered proper to refer to the discharge pressure line. One can then work backward and determine the quantity of air taken in on the suction stroke as indicated by the dotted line in Fig. 1.

Serious doubt of the accuracy of this method has lately arisen and the Verein Deutscher Ingenieure has appointed a committee of practical and theoretical men to establish standards for measuring air quantities and to test the value of present methods.

Many methods, other than direct measurement in gas or air holders, or the estimation of air quantities from indicator diagrams have been used. When a gas flows from one space to another of lower pressure, it assumes a certain definite maximum velocity, provided the lower pressure lies within the limits known as the critical pressure. This velocity is called the critical velocity and is comparatively easily determined. If one allows the compressed air to flow through an orifice (Fig. 2) of definite size into a space in which the back pressure is not allowed to exceed the critical, then the quantity of air that passes through the orifice in a unit of time is quite definite, and for every size of orifice there corresponds a certain definite air quantity for every initial pressure. If it is impractical to allow the air to escape or if a high enough drop in pressure cannot be obtained, it is still possible to measure air velocities through orifices. By introducing a throat or orifice in the path of an air flow and measuring the pressure difference on either side of it, the velocity through the orifice can be calculated by the formula

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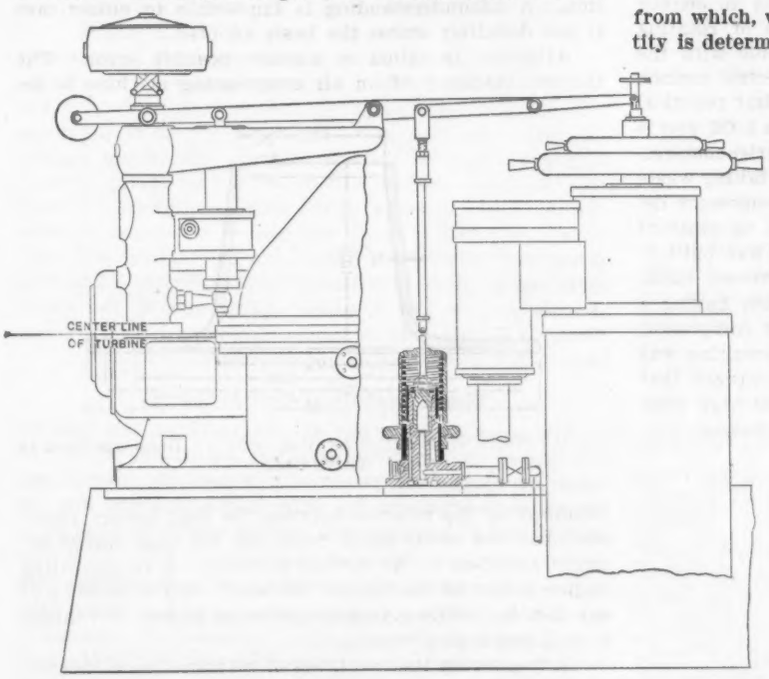

Fig. 4.—Gutehoffnungshütte.

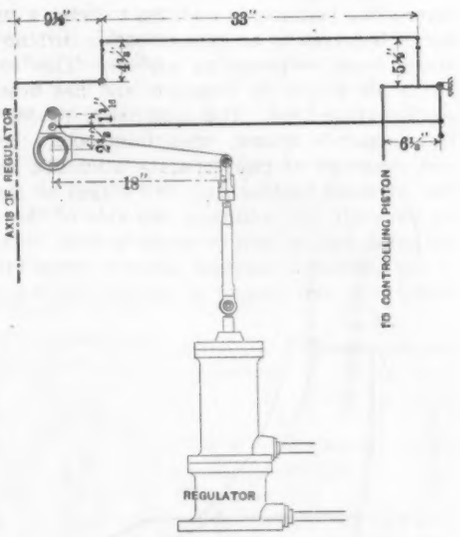

Fig. 5.—Brown, Boveri & Co.

Pressure Regulators.

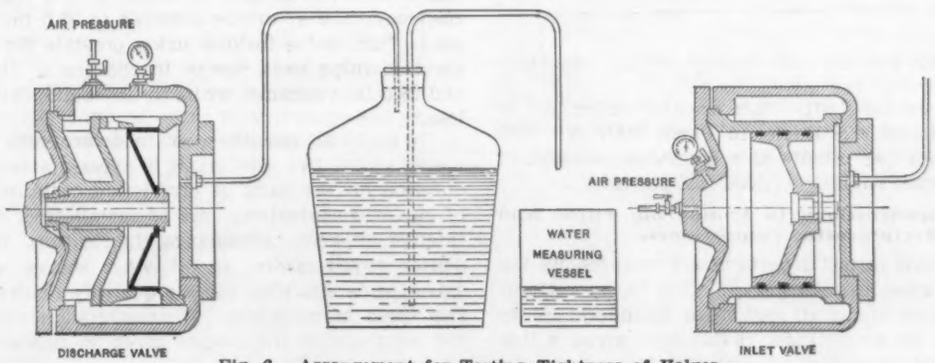

Fig. 6.—Arrangement for Testing Tightness of Valves.

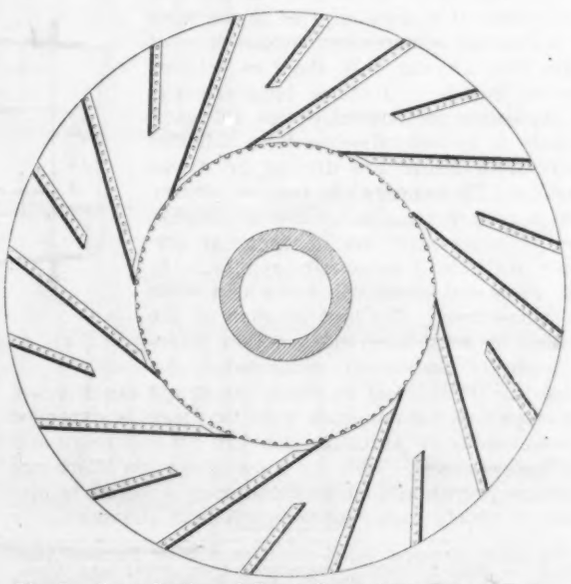

Fig. 7.—Cross Section of Gutehoffnungshütte-Rateau Turbo-Blower Impellor.

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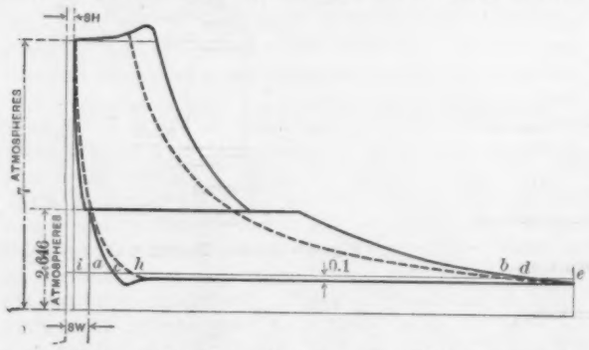

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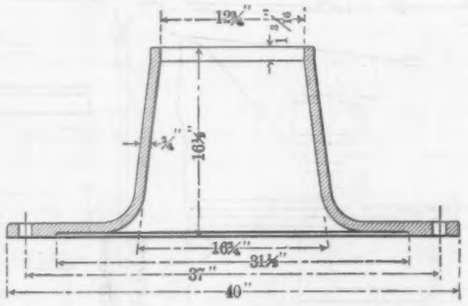

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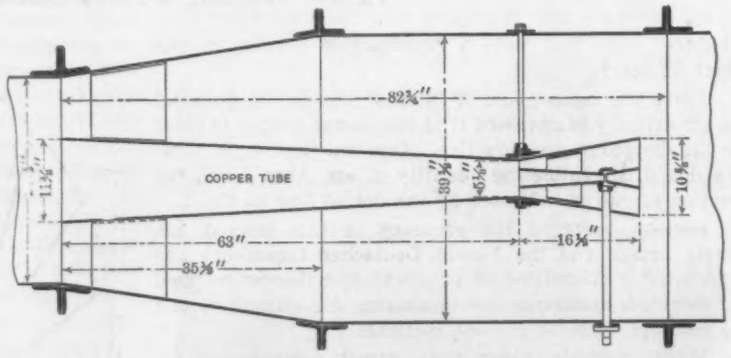

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$$h = \frac{v^2}{2g} K \frac{p}{p_1}$$

from which, when the orifice size is known, the air quantity is determined in the simplest way.

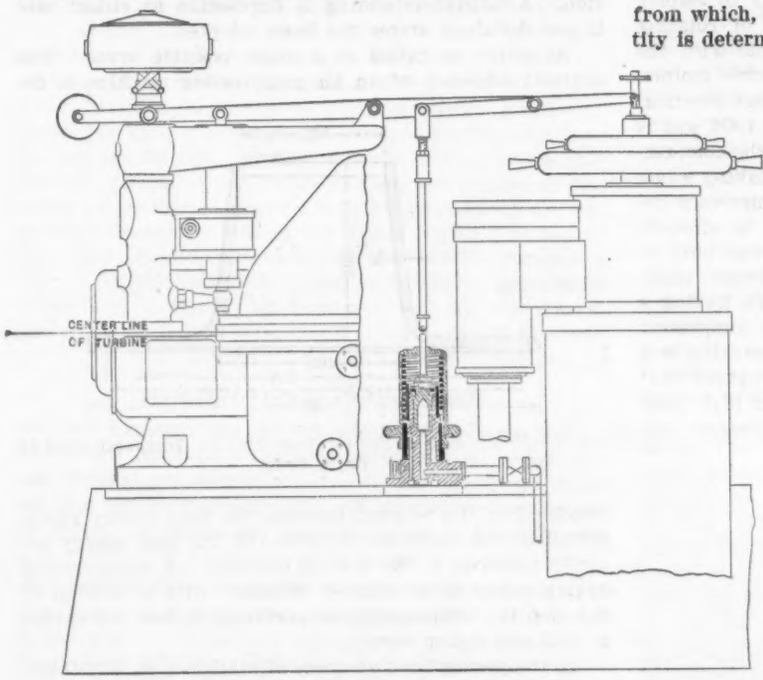


Fig. 4.—Gutehoffnungshütte.

Pressure Regulators.

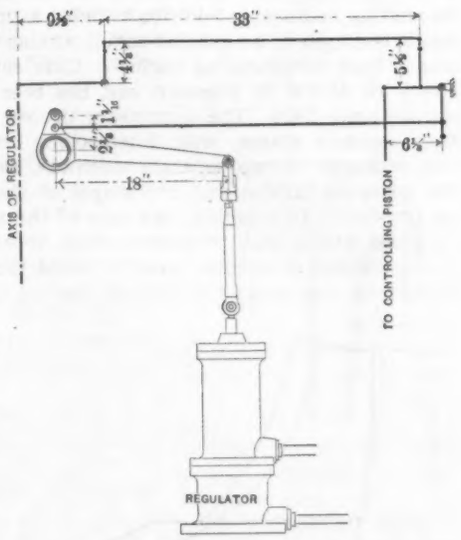


Fig. 5.—Brown, Boveri & Co.

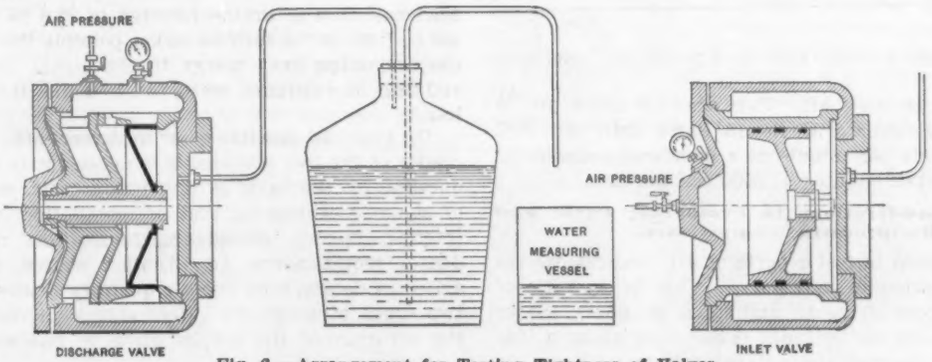


Fig. 6.—Arrangement for Testing Tightness of Valves.

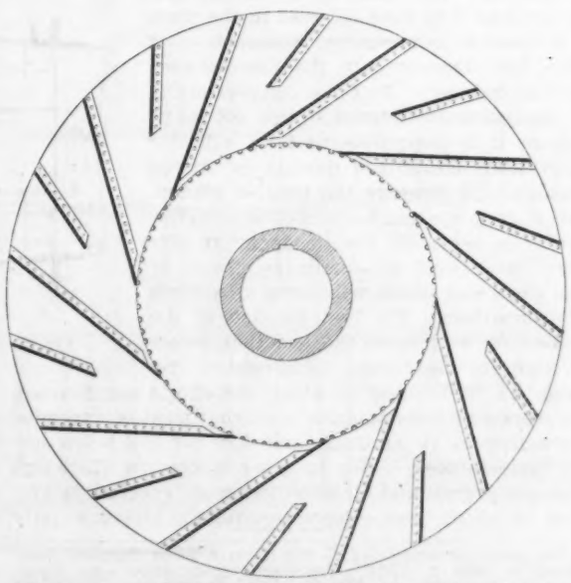


Fig. 7.—Cross Section of Gutehoffnungshütte-Rateau Turbo-Blower Impellor.

If the temperature of the gas or air remains approximately constant on either side of the orifice, which for air measurements in ordinary practice is generally the case, this is a sufficiently accurate as well as simple means of measurement. However, no serious difficulty is introduced, even if it becomes necessary to determine the resulting temperature differences. The instrument used by von Paul de Bruyn for measuring blast furnace gas is well known, however, in blast furnace gas measurements this method does not give very satisfactory results owing to the uncertainty of the exact size of the orifice which becomes coated with entrained dust, and also because in this class of work one has to deal with very low pressure and, therefore, very low pressure differences. To measure small pressure differences accurately liquids of low specific gravity are employed in inclined glass tubes. If, further, the instrument is provided with a quadratic scale, values can be read from it in direct proportion to the air quantities flowing at any time.

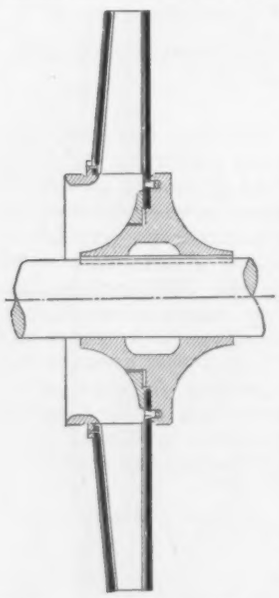


Fig. 8.—Axial Section of Jäger Impellor.

Some object to rotating compressors, claiming them to be uncertain on account of their slip. The application of the method of air measurement just described presents a means of being certain that the machine is actually compressing air and not merely whirling it. When no air is discharged the velocity through the orifice is zero and likewise the pressure difference zero. Now if one permits this pressure difference on each side of an orifice to affect the control of the machine in such a way that with decreasing quantity of air discharged the machine gains speed and in turn develops a higher pressure, the objection is removed that can be raised to turbo blowers for blast furnace work. The machine will increase speed and concurrently its discharge pressure up to the limit of its capacity.

Governing.

To obtain a high enough pressure difference for this method of governing without excessive throttling, several orifices are introduced into one another, as per Fig. 3. In the outside orifice there is a small pressure corresponding to the higher velocity. The difference between the pressure in the main and the pressure in the inside orifice is considerable and affords reliable governing. This pressure difference acts on the spring loaded piston shown in Fig. 4, and shifts the fulcrum of a lever, on one end of which is attached the governor, on the other the inlet valve of the driving machine. Fig. 5 shows a similar arrangement used by Brown, Boveri & Co., in Baden.

When a turbo blower is thus governed interruption of air discharge with a hanging furnace is impossible. The steam turbine must be large enough to develop the maximum energy required at any time, just as the steam engine of a piston blowing engine. The steam engine, like the steam turbine, will stop if the air energy exceeds the maximum capacity of the steam cylinders. A turbo blower at constant speed will deliver an almost uniform pressure. Difference in output can be obtained with constant speed by the introduction of a throttling valve, and in this respect lies a salient advantage of the turbo blower. Within certain limits any desired pressure can be obtained at any volume of discharge.

Measurements of Performances.

The work done by the driving machine can best be determined by measuring the heat quantities, which are taken up by the air, the cooling water, the outside air, the oil on the bearing, &c. The calculations can then be carried out in a simple way by the equation

$$dQ = di - Av.\ dp.$$

It is beyond the province of this paper to go further into the details of these determinations. Suffice it to say that a comparison of the work done determined by experiment with the theoretical minimum required for isothermal compression will give an efficiency value. A comparison of the heat energy consumed (which is established from the steam consumption of the driving machine and its heat value), and the heat energy of isothermal compression of the air quantities actually compressed, gives the thermal efficiency of the entire unit.

Since the decision as to the advisability of installing one or the other type of power machine generally resolves itself into considerations of operating cost, it would be

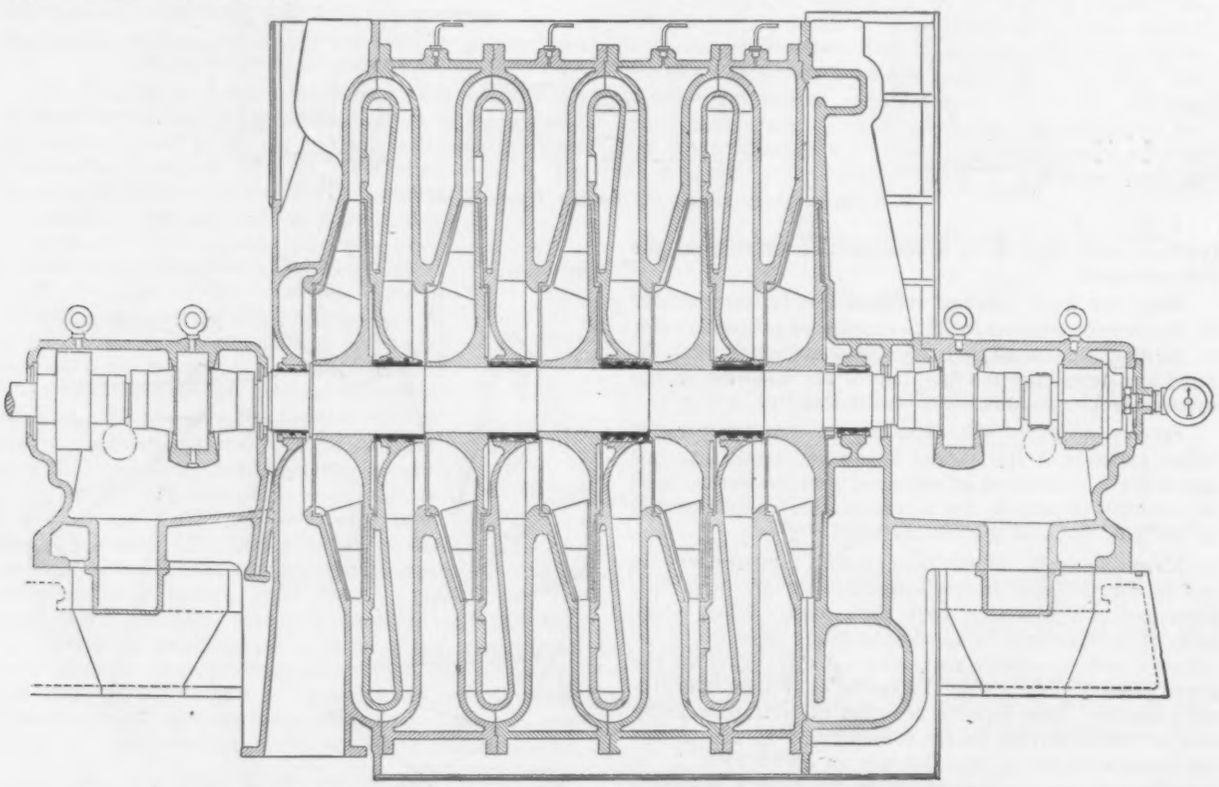


Fig. 9.—Axial Section of a Five-Stage Gutehoffnungshütte-Rateau Turbo-Blower.

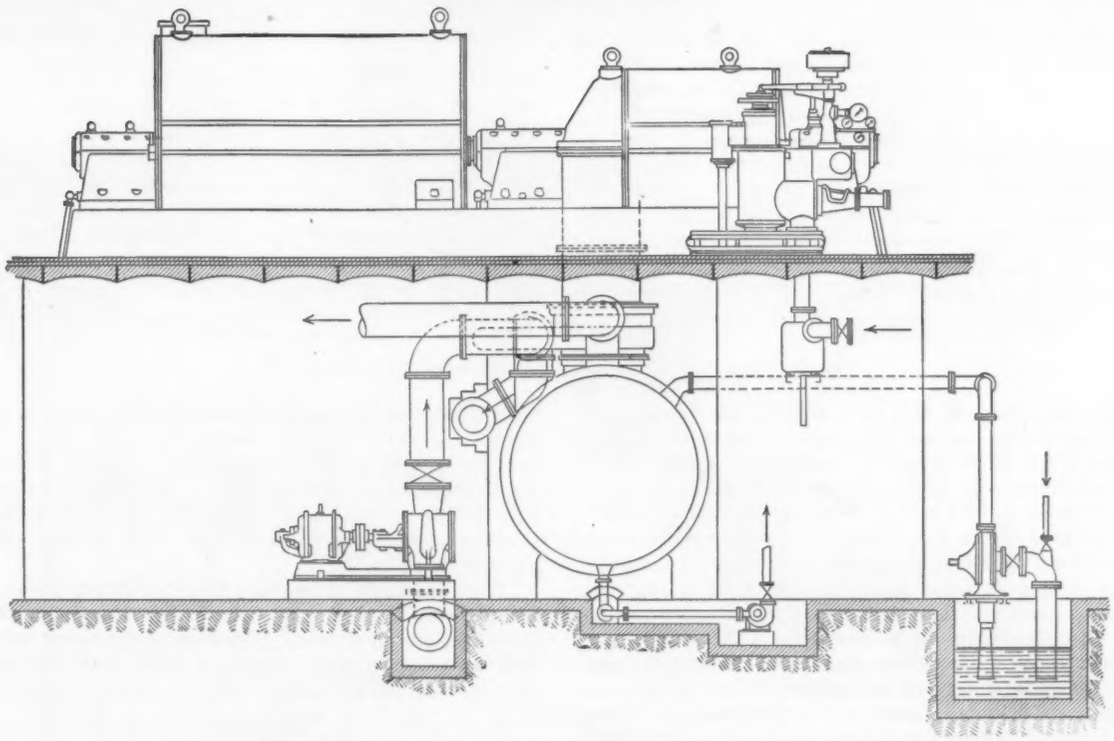


Fig. 10.—Elevation of an Installation of a Steam Turbine Driven Rotary Air Compressor.

pertinent to consider this phase of the question. Since the gas engine and reciprocating blower, in the absence at present of a gas turbine, are competing in blast furnace work with the steam turbine and the turbo blower, consideration will be confined to this case.

Relative Operating Costs.

In the technical press articles in which the relative operating costs are shown for steam and gas driven machines, the value of the blast furnace gas is placed either at nothing or at an arbitrary value, depending upon the system the author advocates. On such premises it is possible to show one or the other case to advantage at will. In plants so located that the surplus gas cannot be converted into a saleable by-product to outside consumers, and having sufficient quantities of gas to satisfy all requirements, the gas has no value because it has no market. Should it possess a market value, which value is generally estimated on the basis of the heat value of the gas in comparison with the heat value and cost of coal in the particular vicinity, it becomes a question whether gas should be burned in hot stoves or sold and the air blown heated in some other more economical manner. Apparently no one has ever valued the gas burned in the hot stoves higher than its cleaning cost. The gas is a by-product incidental to the making of pig iron, and that not burned in the hot stoves or converted into energy must be wasted. Only when it is possible to utilize to advantage all the energy that the gas possesses when used in the most economical manner can the gas have a

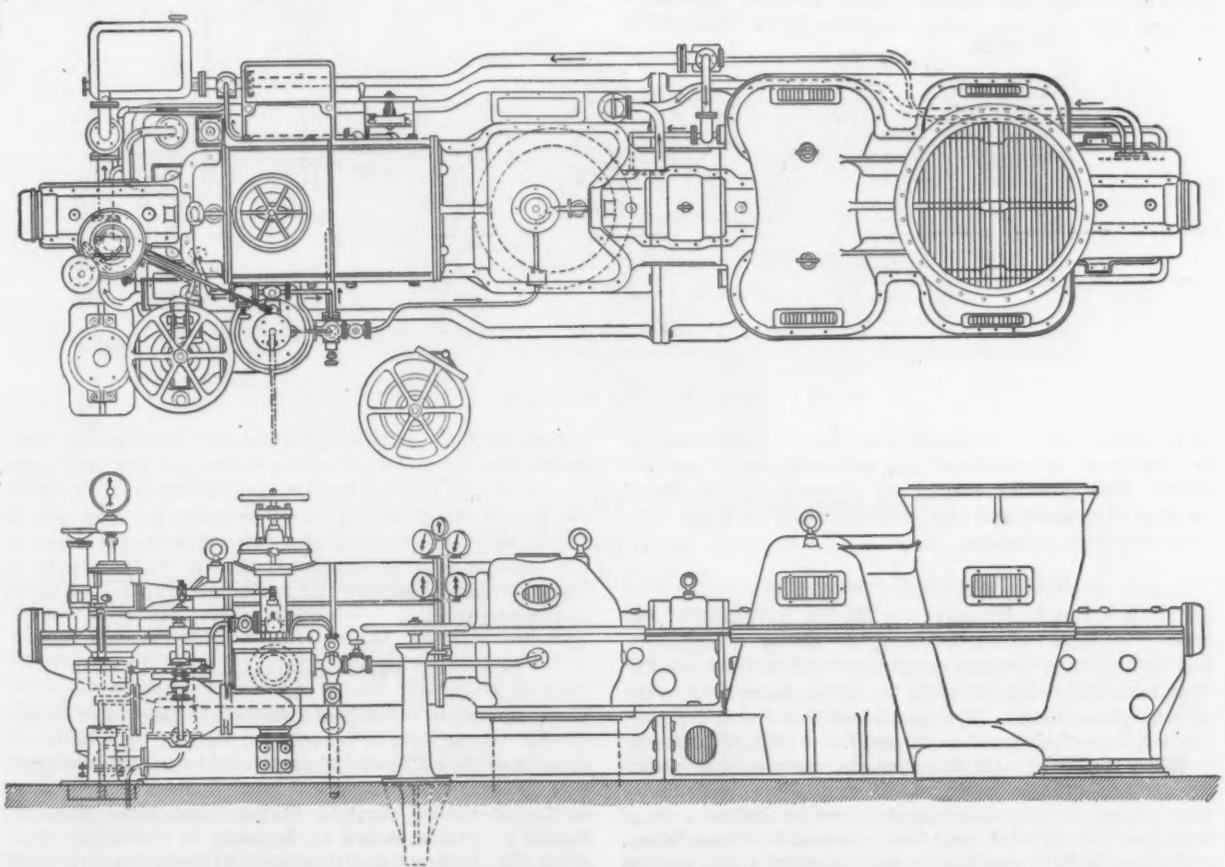


Fig. 11.—Plan and Elevation of a Parsons Type Compressing Unit Built by the Erste Brünner Maschinenfabriks-Gesellschaft.

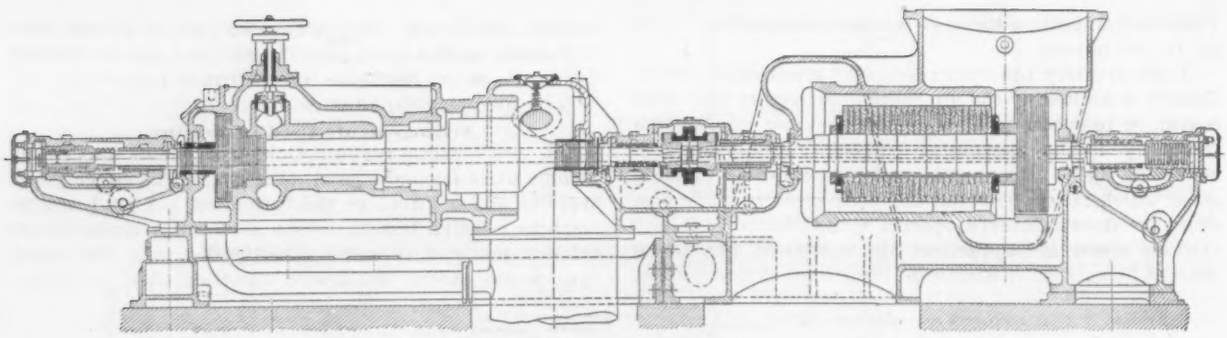


Fig. 12.—Longitudinal Section of a Parsons Set for Furnace Blast.

value placed upon it, and then only on the basis of the prevailing prices for electric energy, compressed air or the gas itself (if it is sold or used in its original state) in competition with other sources of energy.

Therefore, in very many cases, particularly in isolated blast furnace plants, the question of whether steam or gas drive should be adopted should be carefully considered. Always where sufficient gas is available for a long time to come, to satisfy the requirements of the plant, steam drive is undoubtedly to be preferred. Safety in operation, decreased danger from shutdowns, feeling of security of those in charge do not appear in the estimates of comparative operating costs, but nevertheless are important factors. Where a value can be placed on practically an unlimited quantity of energy, gas engine drive is certainly in order. Where part of the energy is developed by gas fired boilers, a serious study of the situation will guide one to steam turbine drive, where formerly fashion

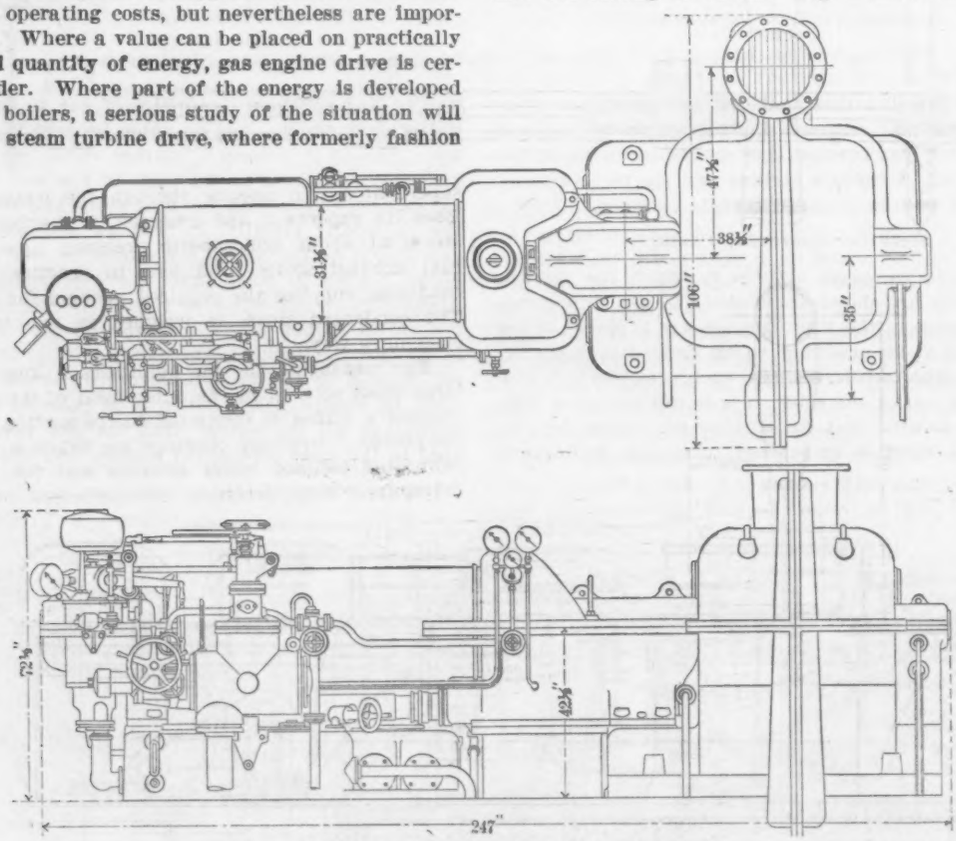


Fig. 13.—Plan and Elevation of a 750-Hp. Turbo-Blower..

(one cannot call it anything else) or an overestimated evaluation of the merits of gas drive, pointed to gas engines. This question should be carefully studied based on past experience and the progress made in steam turbines and turbo blowers.

Reciprocating Compressors.

Since scientific investigation of the influence of various conditions on the efficiency of piston compressors has been guiding designers, the principal parts of the air cylinders, especially in large machines, have undergone considerable change. Now provisions are found for taking air into the cylinders at as low a temperature as possible, combined with the most elaborate arrangements for cooling. Radial slide valves in the air heads have been almost entirely eliminated in recent designs. Only with the most careful machine work and accurate fitting and grinding is it possible to get the sliding grid valves tight under the temperatures at which they have to work. Poppet valves or these in conjunction with slide valves are now found on air compressors, although there are good compressors having either only poppet valves or only sliding valves. High speeds likewise have firmly established themselves in compressor work, making electric drive quite suitable.

What influence valve gears have on efficiency has been brought out in a general way in the discussion of air quantity determinations. Prominent compressor builders such as Pokorny and Wittekind have gone extensively into the testing of valves. Fig. 6 shows arrangements for testing the tightness of valves and valve seats. Compressed air is applied above the valve, and any leak passing the seat is allowed to pass into the bottle, from which the rate of water escape into a measuring vessel can be determined. The making of a valve tight under a test of this kind is still no guarantee that it will continue to stay so in actual service and under the influence of shock and temperature.

Turbo Compressors.

Compression takes place in turbo compressors in a similar way to that in centrifugal pumps. In a series of impellers free air is compressed to the desired final pressure. Figs. 7 and 9 show the cross and axial sections of an impeller with straight blades (Gutehoffnungshütte-Rateau). Fig. 8 shows an impeller of the Jäger type, while Fig. 9 shows the type used in blast furnace work

(Gutehoffnungshütte-Rateau) having a capacity of 42,400 cu. ft. per minute.

Unfortunately the construction of electrically driven blowers is limited by the alternating current motor. One is tied, so to speak, to 1500 or 3000 rev. per min. by the frequency of the alternating current, and considerable inconvenience is encountered in an attempt at variable speed which latter, however, has been recently made possible by Brown-Boveri's special transformers. Where variable speed is impractical air regulation has to be effected by suction or discharge throttling, although blast furnace work, being very constant in its character of load, requires very little adjustment.

Any desired regulation, however, can be obtained without any difficulty whatever with steam turbine drive, which lends itself admirably to this particular service. Fig. 10 shows such a machine, having a capacity of 42,400 cu. ft. of free air per minute. Figs. 11, 12, 13 and 14 illustrate a number of blast furnace blowers and high pressure compressors which command interest. The end thrust is taken care of in most cases by the balancing of the individual impellers, with the addition of a thrust marine type bearing for safety; in other cases separate cylinders are arranged to work against one another and balance the thrust. The output can also be divided into two equal parts having separate suctions and a common discharge, as is often done in centrifugal pumps.

The following explains the

Arrangements Used in Testing,

which were specially built for experiments on steam turbine driven compressors. (Fig. 15.) The boiler plant supplies steam direct to the turbine if a high pressure machine is being tested, or to a feed water heater if an exhaust machine is under investigation. In the latter case steam enters the heater throttled and, therefore, superheated. In passing through the water the steam loses its superheat and emerges in the form of moist steam at about atmospheric pressure, approaching actual exhaust steam conditions in practice. A surface condenser supplies the required vacuum for the turbine. The condensed steam is weighed in two tanks in the customary way.

For measuring the air quantities a long receiver of large cross section, in the outer head of which is placed a suitable orifice, is connected to the suction inlet of the compressor. Pressure readings are taken with carefully calibrated inclined water columns and the temperature determined with precision thermometers. The suction inlet of the compressor proper has a gate valve to adjust the inflowing air quantity. At the discharge end of the compressor another gate valve affords means of obtaining the required discharge pressure. Next to this valve is a large receiver with several perforated partitions in it, which destroy any eddies in the air which would affect the accuracy of the measurement. At the end of this receiver is another orifice through which the air escapes to the atmosphere. This latter orifice serves to measure the quantity of air actually compressed. The cooling water for the jackets and bearings is measured in both quantity and temperature rise. The heat lost to the surrounding air has not been determined up to the

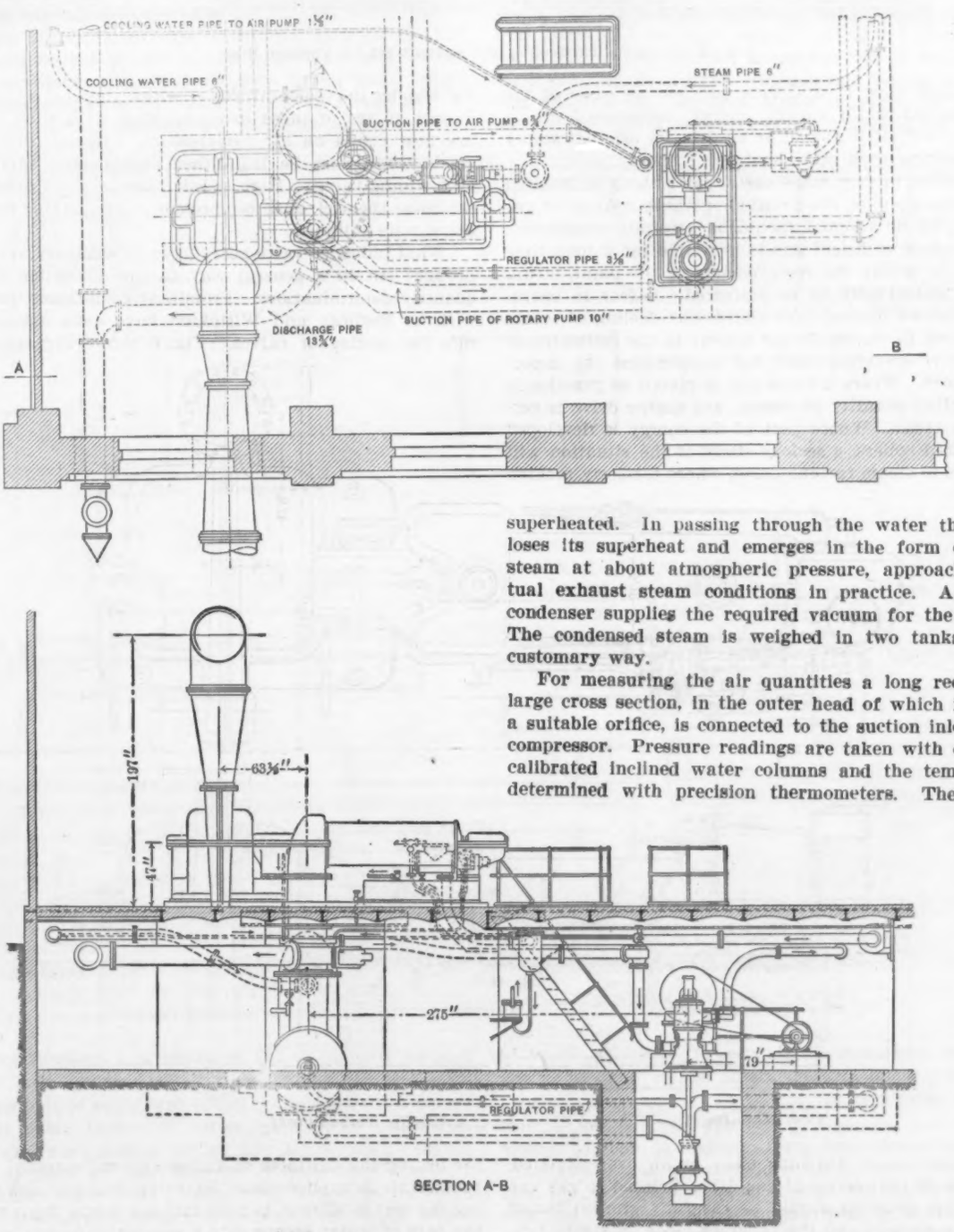


Fig. 14.—Plan and Elevation of an Installation of a 750-Hp. Brown, Boveri & Co. Turbo-Blower Set.

present, as the compressors are so efficiently water jacketed that this is too small to detect, and is, therefore, neglected.

For K in the equation, 0.98 is used. Fig. 15, where the entire air testing arrangement is illustrated, shows a compressor of 4700 cu. ft. per minute capacity, 90 lb. gauge discharge, driven by an exhaust turbine running 4000 rev. per min. Three such machines have already been built and the test results obtained are highly gratifying. Of all steam users the exhaust turbine is most suited to get the maximum mechanical energy out of the steam up to the highest attainable vacua of to-day. When one considers that the exhaust turbine can convert into mechanical energy the steam that in many cases is allowed to escape, and generate from it electric and compressed air power, it would seem that the exhaust turbine as an economic consideration is far in advance of all other machines. Estimates of operating costs in such cases would give surprising figures in favor of the rotating machines.

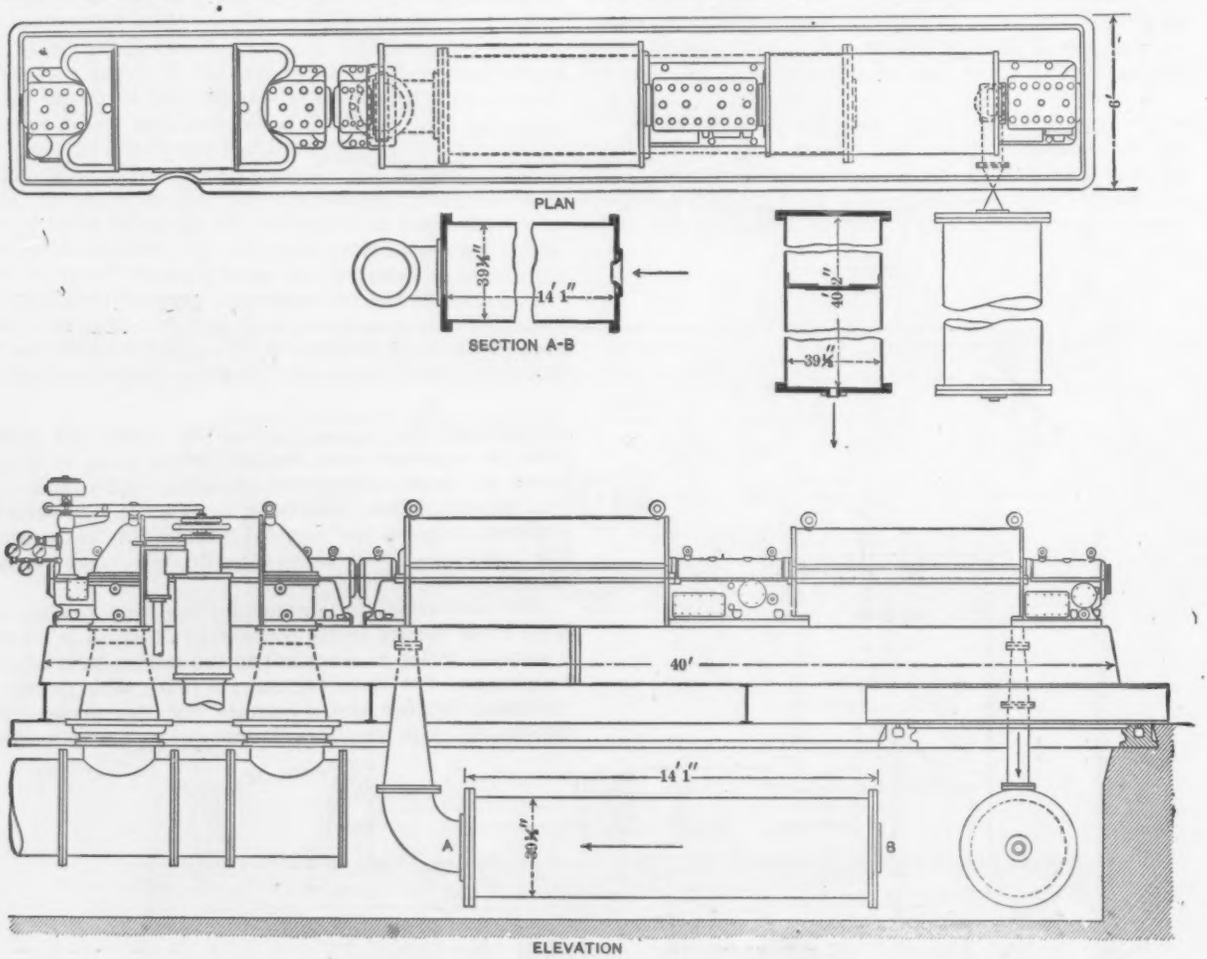


Fig. 15.—Plan and Elevation of a Testing Arrangement in the Works of the Gutehoffnungshütte.

Test Results.

Unfortunately any great number of definite figures from reliable tests of turbo blowers are not yet available. The difficulties that were to be surmounted lay, not only in the details of construction of the machines, but also in the designing and making of suitable means for testing. The following, however, gives some figures and curves of tests made on the 4700 cu. ft. per minute compressors built by the Gutehoffnungshütte. One of these has already been accepted and has been put into regular service.

The curves in Fig. 16 show the performance of this machine at a constant speed of 3600 rev. per min. The conditions of the test were very unfavorable, as there was not sufficient cooling water. Subsequent tests made when sufficient water was available showed that it was possible to cool the air at the various stages to inlet temperature and lower. The cooling water quantities flowing through the jackets were very carefully determined, as well as the temperature rise of the water and the air. Air quantities discharged by the compressor were determined by the methods outlined above.

The trial was carried out over a range of pressures from 15 to 105 lb., while the volumes displaced adjusted themselves as shown on the pressure volume curve of Fig. 16. The efficiencies shown are referred to the isothermal basis and represent the ratio of work actually applied to compressor coupling to the minimum required for isothermal compression of the quantities actually compressed. The temperature rise of the cooling water on the bearings was not determined, but was quite extraordinarily low. It can be safely said that the mechanical efficiency of the unit is not lower than 98 per cent. Other tests made have shown still better results, especially when larger quantities of water were at hand.

The curves in Fig. 17 show the pressure distribution in the various stages of the machine at final pressures ranging from 15 to 105 lb. gauge at a constant speed of 3600 rev. per min. Up to 45 lb. absolute most of the compression takes place in the first stage of the compressor, which is diagramatically illustrated along the ordinate of the curve, and in the second part very little further compression is effected, and, in fact, in some cases an expansion takes place. Only when running at higher discharge pressures is a pressure rise obtained in all parts of the machine. At the highest pressures the second half of the machine contributes more to the entire amount than the first.

From efficiency tests made on reciprocating compressors it has been found that they consume on the average when running on 120 lb. steam pressure condensing, about 15.5 lb. per indicated horsepower hour. At a mechanical efficiency of 85 per cent. an indicated air horsepower hour is obtained on 18.5 lb. steam. The heat energy utilized by the engine compared with the heat energy of the useful work done shows an efficiency of 45 per cent.

According to reports of tests made by Julius Fürstenau, an air horsepower hour has been obtained with a blower driven by a Parsons turbine at a consumption of 16.4 lb. and a turbine horsepower hour at 14.20 lb. This

consumption at 111 lb. gauge initial pressure and 28.65 in. vacuum represents an efficiency of 49 per cent.

A comparison of two reciprocating machines and one turbine compressor in the same station showed the cost of steam for compressing air in the respective machines to be from 6 to 16 per cent. lower in the case of the turbo compressor.' Exhaustive experiments on a turbo blower built by Brown, Boveri & Co. gave the results shown in Fig. 18. At Chasse where a Rateau blast furnace turbo blower is in service, efficiencies of the blower proper of from 68 to 72.5 per cent. are being obtained, depending upon the loading. (Fig. 19.) An efficiency of 65 per cent. of the compressor corresponds to an overall thermal efficiency of 44 per cent. The tests of the turbo blowers made at Rothe Erde by K. Rummel showed a consumption of 21 lb. per effective horsepower hour and an overall thermal performance of 38 to 42.5 per cent. As evident from the figures presented, the thermal efficiencies of piston compressors (determined by methods which have been common practice up to the present and which are subject to grave doubt as to their specific accuracy) do not exceed by a large margin those of rotating machines, hence the turbo compressor is in position to compete with the older form of machine.

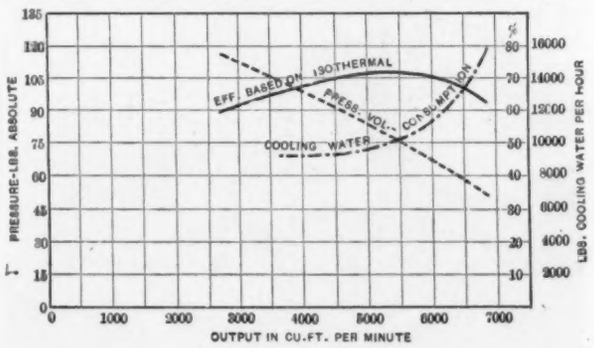


Fig. 16.—Test Curves of a Turbo-Compressor Built by the Gutehoffnungshütte.

Advantages of Turbo Compressors.

With respect to the advantages of the high speed rotating machine over the reciprocating compressor, the same arguments hold as in the application of steam turbines for electric power generation. Other advantages entirely apart from first cost, floor space and maintenance cost are to be found in decreased cost and reliability of operation. It is believed that the fullest confidence can be placed in this type of machine if it can be expected to develop the efficiencies in everyday practice after several years of service that it shows now on the testing floor. That there is very little occasion to doubt the durability and continued efficiency of this machine is evident from the few parts that enter into its construction and the simplicity of their detail. The serious difficulties inherent in high speed rotating machines have long been overcome in the steam turbine.

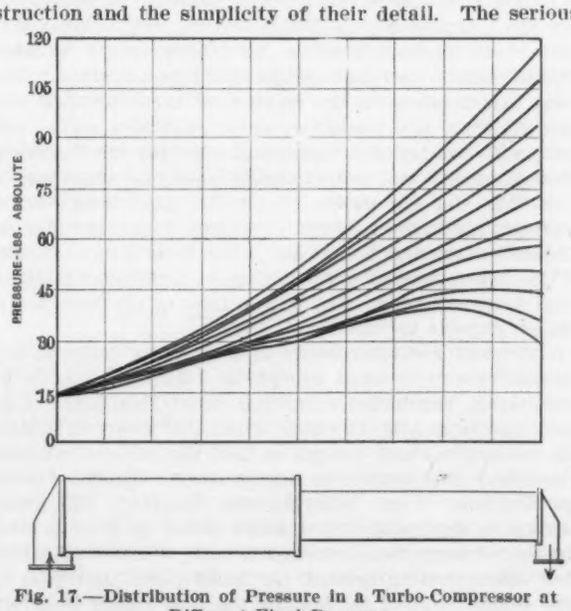


Fig. 17.—Distribution of Pressure in a Turbo-Compressor at Different Final Pressures.

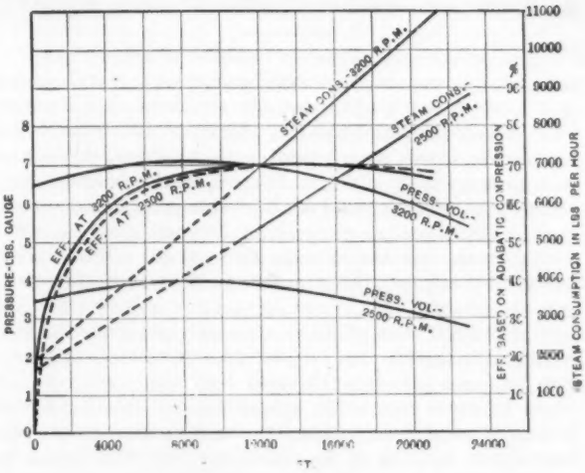


Fig. 18.—Test Curves of a Turbo-Blower at Marcinelle.

As soon as the future gives us a practical and commercial gas turbine the field of the rotating machines will be established. From present indications, however, the prospects of attaining this are not very bright. Until then the gas engine will hold, unchallenged, its place as the cheapest form of energy. It will be used principally for generating electric current, while the furnaces will be blown with electricity driven blowers, which offer such alluring advantages of simplicity and reliability.

J. W. S.

Improvements at a Tool Steel Plant.—The Vulcan Crucible Steel Company, Aliquippa, Pa., manufacturer of tool steel, is erecting a new 10-ton annealing furnace and will probably erect another 10-ton furnace within the next month, about doubling its annealing capacity.

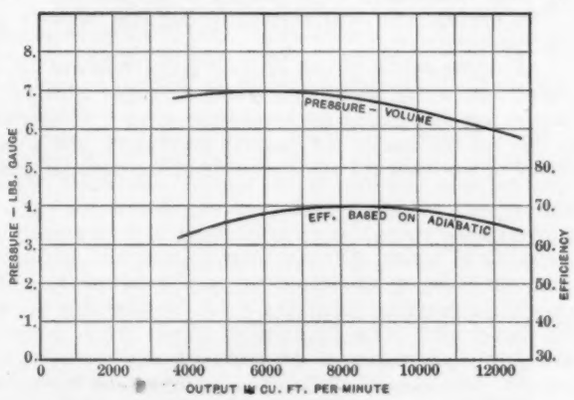


Fig. 19.—Test Result of a Rateau Blower at Chasse.

Some time ago a new steel building, 72 x 190 ft., was erected, equipped with a 20-ton Pawling & Harnischfeger electric traveling crane and a 5-ton steel hammer, and the company will move into it four other hammers, of 2500, 1090, 750 and 500 lb. capacity, and four heating furnaces now located in another building. The old building will be removed to allow other improvements to be made. The company now operates a 10 and 12 in. mill, the building containing these mills also having machinery for roll turning, &c. A new brick building, 50 x 100 ft., is to be erected, which will allow the machine shop to be centralized. The erection of a new steel building, 80 x 200 ft., equipped with a 14-in. mill, engine, &c., is also contemplated. The plant comprises 10 acres, located on the Pittsburgh & Lake Erie Railroad, from which a siding is run into the property. This is to be rearranged and connected with an industrial track system to afford better shipping facilities. Since the company engaged in the manufacture of tool steels it has made improvements from time to time and now has one of the most complete tool steel plants in the country. In the past year it has operated on single turn. Current business is good, with a very encouraging outlook.

A New Cochrane Feed Water Heater.

The practice of utilizing exhaust steam for heating or drying purposes is becoming general. If the piping system is properly designed for the flow of the larger volume of steam and for the avoidance of air or water binding, exhaust steam heating is in every respect as satisfactory as live steam heating, and offers a great economy in fuel, since a pound of exhaust steam contains just as much heat as a pound of live steam at the same temperature, and in fact from 80 to 90 per cent. as much available heat as was present in the steam before it passed through the engine cylinder. Where there is need for all of the available exhaust steam for heating or drying purposes the cost of fuel for running the engine becomes almost negligible.

In many of the early exhaust steam heating plants it was attempted to utilize the existing live steam piping, which, because of its small size and because of its arrangement, frequently placed a considerable back pressure upon the engine. It was also found that where the engine exhausted directly into the piping system the latter in time became coated with cylinder oil and grease, so that the efficiency of the radiators gradually became considerably impaired. Because of this oil in the condensed steam and also because of the lack of suitable receiving tanks for collecting the condensed returns, the latter were often permitted to run to waste, representing a loss not only of the water but also of an amount of heat required to raise an equivalent weight of cold feed water up to the temperature of the returns. Not only this, but the water thrown away was, except for this content of oil, pure, distilled water, containing no scale-forming matter, and unequalled for boiler feeding purposes. The obvious waste in buying or pumping cold water to feed the boilers while hot water was being discharged to the sewer led to the designing of various arrangements and appliances for purifying the exhaust steam of oil, and for conserving the returns and reheating them before they were pumped to the boiler.

An arrangement still frequently installed consists of the following parts:

An oil separator in the exhaust main, followed by a closed feed water heater, preferably arranged with suitable valves and piping for by-passing when it is desired to cut out the heater for cleaning or repairs, and a receiver or hot well for the reception of the returns, generally fitted with an automatic controller for admitting sufficient raw water to make up for leakage and other losses. From this receiver the water is taken by the boiler feed pump and forced through the closed heater into the boiler. For the drainage of the oil separator a suitable trap must be installed. This aggregation of apparatus requires a good deal of room and a large number of valves, tees, elbows and other fittings, as well as a large labor bill for its proper installation.

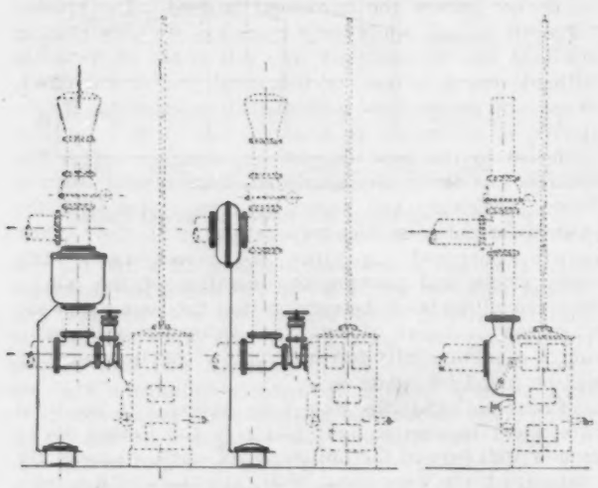


Fig. 1. Fig. 2. Fig. 3.

The Old and New Cochrane Heaters as Connected to By-Pass Surplus Exhaust Steam.

A great simplification and improvement was gained by the introduction of the open heater. It takes the place or performs the functions of heater, separator trap, hot well, cold water regulator and feed water, filter and skimming tank; but to protect the heating system from oil it is necessary either to pass all of the exhaust steam through the heater or else to install an independent separator with trap in the branch exhaust line to the heating system. The objections to the first method are found in the fact that to be able to purify all of the exhaust steam that may be delivered by the engines, an unnecessarily large heater, as regards the water heating capacity, must be installed to get a large enough separator to handle the steam, and even then it is not possible to cut the heater out for cleaning while the heating system is in operation. The drawbacks of the second method, Figs. 1 and 2, are the extra cost of the additional separator, valves and fittings, and of the labor required to install them. Not only this, but it is difficult, in the congested basements of modern office buildings, hotels, &c., to run large piping, say, 12, 16, 20 in., &c., around the corners, or hugging the ceiling or wall, or to double back with the piping, to convey the exhaust from the feed water heater to the heating system and to arrange for the connection through the back pressure valve to atmosphere.

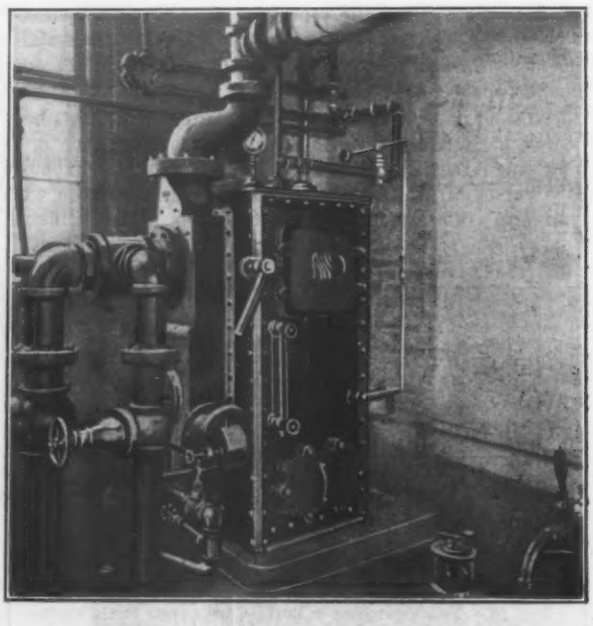


Fig. 4.—General View of the Cochrane Heater with Combined Separator, Built by the Harrison Safety Boiler Works, Philadelphia, Pa.

In Fig. 4 is illustrated a new heater, just introduced by the Harrison Safety Boiler Works, Philadelphia, Pa., by which these difficulties have been neatly avoided, while certain new advantages have been gained. The new heater possesses the features of the older Cochrane heater, that is, it heats the water by direct, actual contact with the purified steam and provides for the retention of precipitated scale-forming matter on trays and in the filter, for the escape of air and gases and for the automatic admission of sufficient raw water to make up the full amount of boiler feed. Fig. 3, as compared with Figs. 1 and 2, shows the saving in equipment required and space occupied. Fig. 5 is a view of the new heater which exposes its interior.

The new feature consists of a specially designed separator, which is large enough in volume to purify all the steam required for heating the boiler feed water, and also to handle the entire amount of steam exhausted by the engines and pumps, so that the surplus can pass directly to the heating or drying system without further purification. Upon entering the separator the steam strikes a vertically ribbed baffle plate, such as is used in the oil separators attached to other Cochrane heaters, but after passing around the baffle plate that part of the steam required for heating the feed supply is divert-

ed into the heater proper, while the surplus steam is passed to the heating system through the steam stack at the top of the separator. The arrangement of parts is such that the feed water will be heated up to the maximum temperature before steam passes to the heating system.

To provide for shutting the interior of the heater off from the steam piping, that is, to make it possible to open and clean the heater while the heating system continues in operation, a cut-out valve is placed in the opening between the heater and the separator, while a similar valve is placed between the overflow opening of the heater and the steam trap; this permits the steam trap to continue to drain the separator even when the heater is cut out of service. The steam cut-out valve is of cylindrical semi-rotating type, and is operated from the outside by means of a suitable lever.

This large separator with valves thus takes the place, it will be noted, not only of the separator on the ordinary open feed water heater, but also of one or more gate valves and tees, and an independent separator with trap and connections. The comparison in the illustration, Figs. 1, 2 and 3, shows the least number of

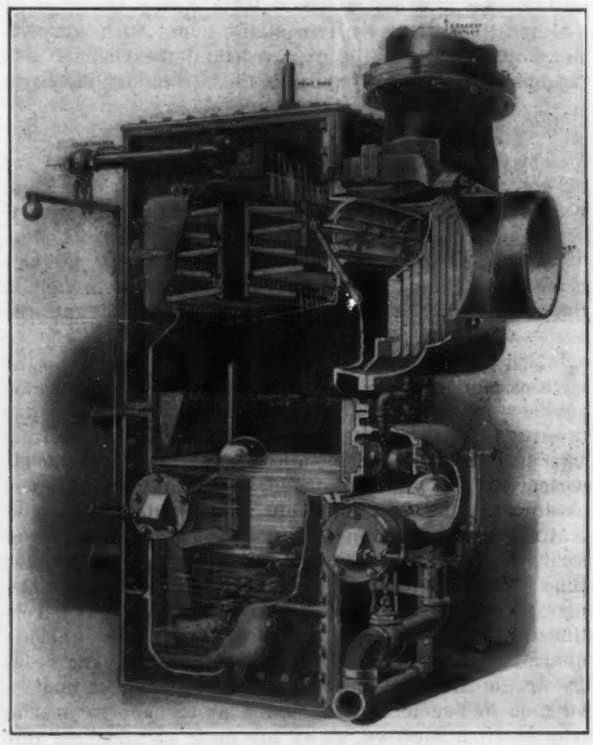


Fig. 5.—Broken Away View of the New Cochrane Heater.

extra valves, fittings, separators, traps, &c., required by an ordinary heater and receiver to perform the functions of the new surplus exhaust and cut-out valve heater. In many installations much more complicated arrangements have been installed to perform this service. For installations where there is no necessity of cutting the heater out of service while exhaust steam is being supplied to the heating system, as where a plant is running during only a part of the 24 hrs., the cut-out valves can be omitted, although they are recommended even in such cases, particularly when the heater is used in connection with a heating or drying system.

The manufacturers of iron and steel and other products in the Pittsburgh, Cleveland, Mahoning and Shenango Valley and Wheeling districts have filed a protest against the present traffic association regulations on demurrage rates and time charges, especially protesting against the 24-hr. law. An accompanying petition, signed by the traffic and freight managers of most of the largest industries in the territory named, asks that certain paragraphs be either amended or expunged from the present rules, and gives at length the reasons for the changes asked.

Cutting Threads on Steel Tubes.

Steel tubes have now so nearly replaced those of wrought iron that those working them to-day may not realize that not very long ago it was found difficult to cut threads on them. The procedure found effective with wrought iron was decidedly inefficient with steel. Some one discovered, however, that if the cutting tool were so shaped or disposed that the edge actually performing the cutting inclined about 15 degrees back from a prolonged radius drawn through the point of attack, then steel could be effectively cut. With wrought iron tubing a cutting edge that was simply a radial plane prolonged was effective. One explanation for the difference is that wrought iron contains more or less cinder imbedded in the metallic body, and the resistance to a cutting tool afforded by a material thus honeycombed could not be so great as that of compact, homogeneous steel. It may be added that this variation of 15 degrees produces a tool that is also effective with wrought iron.

To accomplish in practice this relation between the cutting edge and the work, two courses are open to the machinist. If his tool is horizontally arranged in the tool holder he may adjust it so that the actual cutting will be done at the end of a horizontal diameter, and by notching it from the upper edge may obtain the necessary form, or he may raise his tool holder until the upper edge is 15 degrees (with the work) above the horizontal diameter and grind the end of the tool away somewhat so as to permit the cutting edge to come in contact with the work, and a little more to provide proper clearance. Following either procedure, the cutting operation is performed with a tool which recedes 15 degrees from direct opposition to the movement of the work. This principle of using a wedge form of tool for the threading of steel pipe has application to the machining of steel in general.

Municipal Ownership in Lessening Favor.

At the convention of the National Electric Light Association at Atlantic City, N. J., June 3, the Committee on Public Safety, Samuel Insull, chairman, reported on municipal ownership of gas and electric light plants, saying in part:

"The tendency toward municipal ownership as a cure for every evil, real or imaginary, has continued to lessen materially. While the change has been marked, we do not believe the movement is dead. The present difference is that, while three years ago we were rushing headlong and thoughtlessly into this phase of socialism without regard to cost, or industrial or political effect, to-day any proposal for a municipal undertaking, if considered at all, would be received with little favor and subjected to the most careful investigation. With the inherent tendency in municipal management toward waste, inefficiency and higher cost, contrasted with the progress of public service corporations, with their larger growth, improved apparatus and management, their lower prices and growing consideration of the public, your committee is of the opinion that the time will come when few examples of municipal ownership and operation of a public utility for the supply of gas or electricity will be found in existence."

Frank A. Vanderlip, New York, referred to the total investment in electric light plants in the United States as now well beyond the billion dollar mark, whereas five years ago there were about 4000 companies with a total investment approximating $700,000,000. Mr. Vanderlip believes that the country is entering upon an era in which investors will look with increasing favor upon electric securities, and in which the funds available for electric developments will be secured with much greater ease and at much lower rates than have ruled heretofore.

The imports of foreign merchandise at New York City in May were valued at $70,561,281, as against $49,859,728 for May, 1908, and $72,789,337 for May, 1907.

The attendance on the opening day of the Alaska-Yukon-Pacific Exposition at Seattle, Wash., was 89,286.

Modern Cupola Practice.*

BY JOHN C. KNOEPPEL, BUFFALO, N. Y.

Foundry owners frequently wonder why they are having trouble with their iron, blaming almost everything but their management of the cupola. This has not received the attention that it should, and as a usual thing the cupola is considered foolproof, in fact, is expected to run itself. Good work with the cupola is first of all dependent upon a thorough knowledge of the cupola and its performance while working under the blast. The construction must next be such that the proper amount of air can actually get in, and in such a way that the temperature conditions are as uniform as possible, so that cold spots are avoided. The tuyere area must be of such a size and so arranged that the blast enters the cupola without undue friction.

Preparing for the Charge.

The ultimate shape of the cupola lining, if allowed to take its own course, will be found to be slightly built out above the tuyeres, and this is an argument that, if left that way, it is most desirable for efficient work. Hence in chipping the cupola and daubing up, it were best left so that only the refuse matter and iron above the tuyeres is taken away, but that this natural shape is left intact. The daubing can be very light, and cracks filled with small broken firebrick or flat brick, as the condition may require it. As the heat at this point becomes very intense, there is a tendency for the daubing to crack off long before melting is in progress. This material falls into the stock and retards melting afterward.

Bottom is put in so that the surface, while dipping from back and sides to the spout, does not fall too steep, as the melted material will run downward with too much force, causing trouble in tapping during the heat. It should be so made that the iron will lie quietly on it and not injure or break through it. The necessary shavings and kindling are now put in, the latter being laid by a man in such a way that when burning it will do so evenly and without injury to the bottom. Coke is now thrown in and allowed to burn through evenly. When up to proper hight, as indicated by a wire gauge or other suitable method, charging may begin.

Details of Charging.

Charging should commence at least 2 hr. before the blast is put on, so that the stock may become well heated through, and the time for lighting up should be arranged accordingly. There should be neither too much nor too little coke on the bed. Oftentimes the cupola man is allowed to take all he wants, and the result is a prolonged heat, with dull iron instead of the expected hot material. The iron charged should be of medium size, especially in small diameter cupolas. There should not be too many openings for the free passage or rather escape of the blast. In large cupolas, while the stock can be larger, it should not be charged in too compact a way, thus retarding the blast.

The amount of the bed of fuel for a cupola is determined by a number of factors: The diameter inside the lining, the hight of the tuyeres, blast pressure, class of work, &c. For light work, with practically continuous melting and pouring, the tuyeres should be set low, thus saving fuel for the bed. The bed should extend from 20 to 24 in. above the top of the tuyeres, whether one or two sets are used—above the top of the upper if the latter. On the other hand, the tuyeres must not be set too low, otherwise if any iron is to be held it will be chilled if remaining in too long. From 12 to 16 in. from the bottom plate to the bottom of the tuyeres would seem about right for ordinary practice, the bottom being from 4 to 6 in. thick.

Slagging.

Slagging when the tuyeres are very low often does more harm than good; it retards melting and is destructive to the cupola lining. If the heats are heavy, so that slagging must be resorted to, it is better to put the tuyeres up higher in the first place. The slag hole should not be opened until the slag is high enough to reach it; usually 10 tons or so of metal will have passed out by that time.

In large cupolas for medium heavy work the tuyeres are usually set from 18 to 24 in. from the bottom. The higher they are set the more fuel is required for the bed. More air must be forced through or else melting is unduly slow. High melting zones and blast pressures have a tendency to harden the iron, make more slag and give trouble generally.

The charges of iron should be uniform, the first being as large as the last. While undoubtedly more iron could be carried on the first charge it would mean lowering the bed unduly with subsequent trouble, as the coke charge coming down will not restore the bed to its full hight again. It is the best kind of practice to maintain the bed at its proper hight at all times, and this can only be done by small and equal charges of metal and the proper proportion of coke between them.

In long heats of high tonnage it is oftentimes a good practice to help build up the bed by adding additional coke at intervals. Experience will show this best. The writer has always had better results with such small charges. The melting was more uniform and more rapid, with hotter and better iron. With heavy charges the melting difficulties result in giving metal with compositions different from the expected, and the chemist gets the blame which really belongs to the foundry manager.

The Volume of Air Important.

The construction of the cupola should be such that the air entering has great volume at low pressure rather than vice versa. Good lining material should be used, preferably double up to the charging door and single from there upward. The clay-wash should be mixed a day previous to use, and the addition of a little salt helps to tighten the joints. Space is left between the lining and the shell—about half an inch—and this filled up with a grout of old firebrick, ground up, and clay. The lining at the melting zone, as stated previously, is allowed to take its own shape during the heats, being originally straight like the rest of the construction. If this is done the melting capacity will be found increased. While this is the experience of the writer, he does not wish to be understood as advocating a contracted hearth construction.

Fuel that burns up fast, such as coke, must necessarily be supplied with a sufficient amount of air in quick time. The design of the tuyeres, therefore, plays an important part in this. The writer has found that a continuous tuyere of proper design gives the most uniform distribution to all parts of the cupola furnace. The velocity of the air is reduced and the best kind of melting obtains. When it is considered that to melt 10 tons of iron about 300,000 cu. ft. of air must be admitted into the cupola for that hour, it will be seen that the tuyere conditions must be such that a minimum obstruction shall take place before the blast actually is doing its work in the charges.

The coke below the tuyeres serves simply to hold the iron and support the stock. The temperature is far below that of the iron, and hence every pound thus used, unless for special reasons, is a direct waste. If the iron is held in the cupola too long the blast strikes over the top and injures it. Hence, while on general principles low tuyeres are advisable, they should not be so much so that the metal is damaged when carrying out the daily practice.

The charging door should be as high as conditions will permit above the bottom, so that the fuel will receive the benefit of the heat otherwise wasted. Ten to 15 ft. is the usual custom, though the distance is often made greater. Where a very high stack and charging door is used it is sometimes advisable to put in an intermediate door, so that in charging the first part of the heat the bed is not damaged. Further, it allows a more even charging. This intermediate door should be sealed up when the charging has reached that point, and then the upper door is used. The charging floor would naturally have to be constructed accordingly.

In every cupola, under the same conditions, there is a fixed melting zone. Below and above this the metal

* Read before the American Foundrymen's Association, Cincinnati, May, 1909.

cannot be melted successfully. In either case the metal would be dull and damaged. This zone is determined by the cupola conditions and the volume and pressure of the blast. If the iron comes down within 10 min. of the putting on of the wind it would indicate that the bed was of proper hight. If it takes longer then the bed was too high. The excess of fuel must be burned away, and in doing this the iron is melted slowly and comes dull instead of very hot. The melting zone is usually a space across the cupola about 4 to 8 in. high. Where the blast is heavy this is sometimes greater. A double set of tuyeres sends the melting zone up higher than is the case with one row.

The Fuel Ratio.

Regarding the fuel ratio, this much may be said. What is economy in one foundry becomes a waste in another. The high melting ratios published are oftentimes very misleading. For general purposes 7 to 8 lb. of iron to 1 of fuel is very fair. With the same sized small metal charges the coke between charges generally works out at 1 to 10. This can often be cut a little on the coke end if the bed is ample, especially at the end of the heat. As this work should not be left to the tender mercies of the cupola man, it is a good plan to hang up a chart of sufficient size in the charging room on which every charge is marked plainly, so that it can be followed without difficulty. All stock should be weighed, as even the coke will not run uniform in weight if measured in a basket. This is not with the idea that the fuel should be skimped, but simply to have the conditions in charging as perfect as possible, so that the best results may be expected and obtained.

For 20 years the writer has advocated the use of small charges and as mild a blast as possible, and he is glad to note that others are beginning to agree with him. The question of the tuyeres has been his special study, and he hopes that the system bearing his name may have helped to make the work about the cupola easier and the results surer. The cupola is not merely a vessel into which any old thing can be thrown and good results obtained, but it may become a money maker or loser just as one pleases. In these days of keen competition it becomes a problem not only to melt iron properly and economically, but to turn out a product that will give the smallest percentage of scrap castings.

At the Ohio works of the Carnegie Steel Company, Youngstown, Ohio, five out of six blast furnaces are now in operation, making about 2500 tons of metal per day. The Bessemer plant is running full, and four out of 12 of the open-hearth furnaces at this works are in operation. No. 4 stack, the last to be started, was put in blast on May 28. At the South Sharon, Pa., works of the Carnegie Steel Company, Nos. 2 and 3 furnaces are in blast, and No. 1 is being repaired and put in shape for operation, so that it can be started quickly when needed, but no date has yet been set for its resumption. Eight out of the 12 open-hearth furnaces at the South Sharon works are in operation. On June 7 the Carnegie Steel Company was operating 44 out of a total of 59 blast furnaces. The company is likely to start some more blast furnaces in the near future, as it has no metal of any consequence piled at any of its works, using its pig iron as fast as made.

Certificates were presented to 124 graduates at the commencement exercises of the Winona Technical Institute, Indianapolis, Ind., May 29. Paul Hanus, head of the department of education of Harvard College, made the chief address. John L. Ketcham of the Brown-Ketcham Iron Works, Indianapolis, representing the National Founders' Association, reported to the trustees at the annual meeting that the school for molders had had a highly successful year and that there were bright prospects for the school for machinists, for which a large amount of machinery has been donated. The trustees re-elected Dr. S. C. Dickey president of the institute. John H. Holliday, president of the Union Trust Company, Indianapolis, is chairman of the board, and W. H. Hubbard, secretary. The institute has under way a campaign for raising an endowment fund of $500,000.

Blast Furnace Gas Engines at Barrow, England.

The London *Times Engineering Supplement* gives some interesting details of the recent starting up of a power plant on blast furnace gas at the works of the Barrow Hematite Steel Company, Barrow-in-Furness, England:

The plans were prepared on the assumption that there should be blowing power for four blast furnaces, each engine being of such capacity as to blow one furnace, with a duplicate engine in reserve, and such electrical generating engines as would for a long time suffice for all the motor and lighting power required, to include the electrification of the fitting shops, furnace hoists, pumps and hammers, in order that no gas should be utilized at the iron works for steam raising purposes. It was estimated that, after a loss of 45 per cent. of the gas made being used and lost at the stoves and bells, and a further quantity being set aside for consumption by the engines, there would remain for use at the steel works boilers the equivalent of 1000 tons of coal per week, which worked out in actual practice. The gas available after that necessary for the gas blowing engines and the electric generators was thus sufficient for the firing of Stirling boilers to drive the whole of the Bessemer steel producing plant at the Barrow Works.

It was shown at the end of the first week that there had been a saving of 1000 tons of coal at a cost of about 14s. per ton, besides other economies which will total up to £1000 per week of a saving in the cost of manufacture, thus helping to place smelting and steel making works on the West Coast in a better position to compete against, say, North of England and South Wales makers whose works are alongside the collieries.

The great drawback to the successful smelting of iron and the economic production of Bessemer or acid and open hearth steel in the Northwest of England has always been felt to be the high cost of fuel, which has represented some 5s. 6d. per ton more than the cost of fuel delivered to similar works in the North of England, the vicinity of the Clyde, South Wales and other places. Works on the West Coast have hitherto had the advantage of the cheaper supplies of hematite ore, but, as the production of this ore in the district has been shrinking for a few years past, and, as a consequence, makers have had to begin to use foreign ores on a somewhat large scale, it became necessary to consider how far it was possible to cut down the cost of fuel.

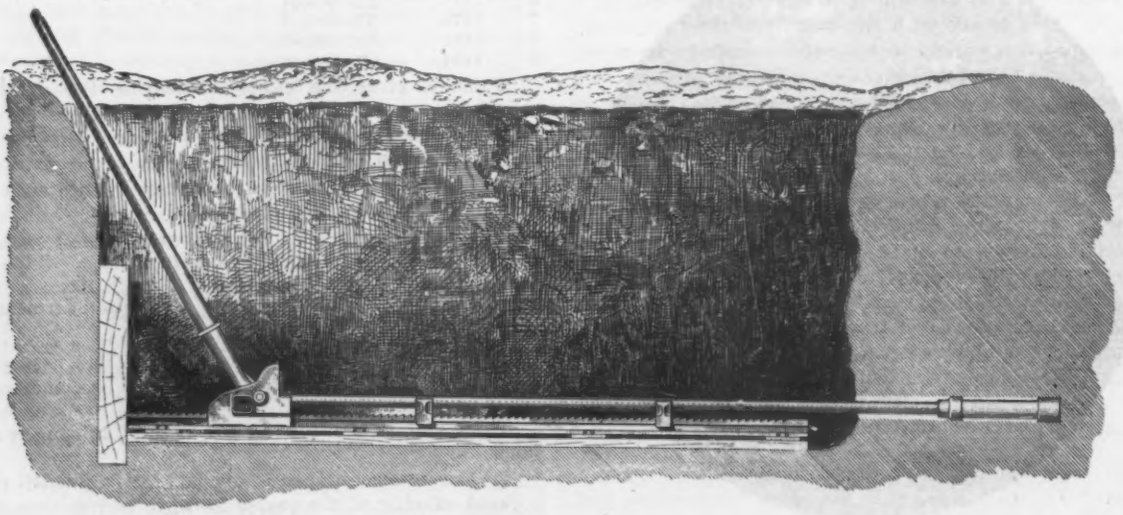
The engine house contains eight gas engines, comprising the following units: Five 1250-b.h.p. gas blowers, one 1250-b.h.p. gas generator and two 750-b.h.p. gas generators. Two of the gas blowers were built by the Lilleshall Engineering Company of Nurnberg design and under their supervision, the remaining three by the Gutehoffnungshutte Company. All these engines work at 90 rev. per min., and are capable of blowing 26,200 cu. ft. of air per minute at a pressure of 8 lb. per square inch, or a reduced quantity at 15 lb. per square inch. The engines for driving the electric generators were built by Richardson, Westgarth & Co., and are of the Cockerill type. The speed of the larger engine is 100 rev. per min. The engines are horizontal, of the four-cycle principle with their two cylinders placed in tandem. The sizes of the generating engines are: gas cylinders 39½ in. diameter by 43½ in. stroke, and 29½ in. diameter by 35½ in. stroke, respectively; and of the blowing engines, gas cylinders 34¼ in. diameter by 43 5-16 in. stroke, with blowing tubs 86 in. diameter, water cooled, which deliver the air into receivers 6 ft. diameter and 14 ft. long surmounting the cylinder. The ignition is effected by current from batteries and is on the low tension principle.

The trustees of Stevens Institute of Technology, Hoboken, N. J., have secured an option on the Castle Point estate overlooking the Hudson and it is expected the sum of $1,500,000 required to complete the purchase will be secured. An effort will be made at the same time to raise funds sufficient to pay off certain indebtedness and to build a new shop and laboratory of electrical engineering, besides adding to the endowment of the institution.

The Duff Pipe Forcing Jack.

For forcing or pulling pipe horizontally through the ground the Duff Mfg. Company, N. S. Pittsburgh, Pa., has developed a device that is a modification of its Barrett jack. This apparatus is known as a pipe forcing jack, and has been used very successfully by a number of gas companies and plumbers for the past year. It has been designed for one purpose only, that of placing pipe under ground without digging a trench for it. Particularly its use is of value for laying service lines under cement sidewalks, lawns and under railroad tracks. By digging a ditch long enough to take the jack and start the first length of pipe, it is possible to lay almost any length of service pipe. This means that the jack will save the user the expense incurred in digging the trench and refilling it when laying service or pipe lines. The jack is capable of driving pipe up to 4 in. diameter, and as great a length as 280 ft. of 2½-in. pipe has been forced through the ground by it.

The jack consists of a cage which travels on a rack and is moved by a socket lever and pawls. At the front of the cage is a groove and clamps for holding pipe from ¾ to 4 in. diameter. The rack has machine cut teeth, and is provided with bolts with which it is secured to a stout plank. It also carries guides for holding the pipe in line, as is plainly shown in the illustration. The parts are malleable iron and steel, and the construction is substantial. All working parts are machine finished.



A Pipe Forcing Jack for Pushing or Pulling Pipe Through the Ground, Made by the Duff Mfg. Company, N. S. Pittsburgh, Pa.

The first step in using the jack, after bolting the rack securely to a heavy plank, is to dig a trench about 2 ft. wide and long enough to accommodate the longest section of the pipe to be forced. The rack is then placed in the back end of the trench and the cage on the rack is put in position and slid along to the back of the rack by lifting the pawl by means of a set screw in the short pawl. The guides are then placed on the rack and the first length of pipe put in position. It is important in starting the first length that the pipe be properly aimed, so that the correct direction will be taken by the pipe as it is forced through the soil. Where the ground contains roots or other materials difficult to penetrate it is found advantageous to use a hardened coupling turned to a cutting edge on the front or driving end of the first section. This coupling will then cut through any reasonable obstruction. A piece of pipe 2 or 3 ft long and a size larger than the line to be laid, which is designated as the pilot, is placed on the advancing end of the pipe. On the front of the pilot is placed a sharpened coupling or point, which is connected to the pilot by a reducing coupling. For example, in laying a 1-in. service pipe it is customary to use a piece of 1¼-in. pipe 2 or 3 ft. long for the pilot with a 1¼-in. sharpened coupling on the front end a 1¼ x 1 in. reducing coupling to connect to the service pipe. In some ground a cone point can be worked to better advantage.

The limit of travel of the cage is 7½ ft., consequently when the pipe has been forced this distance the cage must be drawn back to the starting point and a temporary section inserted. When the first permanent section has been forced far enough it is uncoupled and a new permanent section added. The operation is repeated until the line has been laid. By keeping accurate count of the number of feet of pipe that has been forced it is possible to locate a serious obstruction if one is encountered, which may then be removed by digging down to it. It is also desirable in forcing the pipe to give it a rotary motion by means of a pair of pipe tongs, which helps to preserve the alignment and facilitates the cutting.

Reinforcement for Concrete.

With all the desirable qualities possessed by concrete, there are two disadvantageous ones which, if not correctable, would decidedly limit the application of this material. Its resistance to tension and shearing are low. With its ability to withstand weather changes, fire, internal deterioration, resist compression, its suitability for molding and moderate first cost, it would be unfortunate if the two undesirable characteristics could not be removed to a large extent. The want of cohesion between its particles is at least partly compensated for by using steel reinforcement. The adhesion between steel and concrete is very strong, but this is scarcely to be relied on for severe service, so in the best practice the aim is to secure a mechanical bond by forming the steel reinforcement so that the tensions and shears imparted to the concrete will be mechanically transmitted to the steel. Ultimate dependence is thus put upon the metal. It should practically be so dimensioned as to sustain the whole of the shearing and tensional strains.

In bridge work in Philadelphia the authorities require that the bond between concrete and reinforcement shall be a mechanical one. That is, that there should be an interlocking of shapes, no particular dependence being placed on adhesion. Such reasons are the ones which require that rods intended for reinforcement shall be square originally and then twisted, or shall have protuberances. By such devices, a tensional strain will be transmitted with some effectiveness to the rod—and that is where it must be sustained. Further, to secure a mechanical bond, rods are bent and intertwined with others.

The possibility of using steel for reinforcement depends upon the remarkable fact that the co-efficient of expansion of steel and concrete are approximately the same. If this were not the case, it would be impossible to combine the two with success. If with a 50 degree change of temperature there should be any appreciable inequality of expansion or contraction then there would result a breaking up of the original solidarity.

A matter of importance is the life of the reinforcement. Concrete properly made is practically indestructible by the weather. The Pantheon at Rome, rebuilt 123 A. D., is still standing and presents for examination its great dome of concrete. This has a span of nearly

150 ft. The question is will steel imbedded in concrete last indefinitely? Probably there is not at present available sufficient evidence to settle this question finally. A piece of iron—not steel—has been found which was probably imbedded in the original concrete of the Pantheon and is in a good state of preservation. What the conditions were when it was imbedded and whether they are being repeated now is not known. Reinforced concrete construction is relatively modern, and practically no data exist to settle the question of its endurance under modern conditions.

The Annealing of Steel Castings.

It has long been an undecided question whether the temperature that is correct for refining the coarse structure of overheated steel is also suitable for removing that of unannealed steel castings. Under the microscope these two types of structure are very dissimilar. That of a casting is well shown by the accompanying microphotograph, which is taken at 100 diameters. It displays what is known as "ingotism," and is taken from an acid Bessemer ingot containing about 0.45 per cent. carbon. The settlement of the question mentioned above is of con-

Ingotism in an Unannealed Steel Casting.

siderable importance to manufacturers of steel castings, for the material will only possess the best qualities when the coarse ingotism is removed. Speaking generally, annealing has been carried out at what was known to be a suitable temperature for a worked steel of the same composition as the casting.

A recently published paper, prepared for the American Society for Testing Materials, though not read at the annual meeting, bears directly on this subject. The authors are W. T. Koken, Dr. W. Campbell and Prof. Henry M. Howe. It appears in volume VIII of the *Proceedings* of the above society, and bears the title, "Can Ingotism Be Cured by Prolonged Exposure to the Temperature at Which Overheating Is Cured?"

Of the pieces worked on the first was a steel casting, both in the untreated condition and after having had the coarse structure removed by heating to 1377 degrees C. (2510 degrees F.). The composition was:

	Per cent.
Carbon	0.43
Silicon	0.40
Manganese	0.78
Sulphur	0.05
Phosphorus	0.05

The second was a rolled steel which had been given an artificial coarse structure by overheating to the temperature given before—namely, 1377 degrees C. Its composition was:

	Per cent.
Carbon	0.38
Sulphur	0.04
Phosphorus	0.06

The critical temperatures of the casting were:

Ar 1	705° C.	(1301° F.)
Ac 1	760° C.	(1400° F.)
Ar 2-3	762° C.	(1403° F.)

A series of sets was made comprising one piece of the untreated casting, one piece of the treated casting, and one piece of the treated rolled steel. Each set was heated to a definite high temperature and then either cooled slowly immediately after reaching it or else held there for some considerable time and then cooled slowly. The first mentioned heatings were carried out in a gas forge and the second in a Sauveur muffle, heated internally by the resistance of a coil of platinum wire. The temperatures were controlled by means of a Le Chatelier pyrometer. Pieces were prepared from each steel after each treatment and examined microscopically, the results being given in the two following tables:

Table 1.—Steels Heated to Temperatures Given and Immediately Cooled.

		Effect on coarse structure of—		
No.	Temperature reached. Degrees C.	Untreated casting.	Casting overheated at 1377° C.	Rolled steel overheated at 1377° C.
1	804	Not effaced.	Not effaced.	Not effaced.
2	840	Not effaced.	Effaced.	Effaced.
3	861	Not effaced.	Effaced and new network begins.	Effaced and new network begins.
4	1000	Not effaced.		
5	1050	Not effaced		
6	1118	Not effaced.		
7	1171	Not effaced.		
8	1180	Not effaced.		
9	1194	Effaced.		

Table 2 gives the effect of heating the untreated steel casting to 840 degrees C. (1544 degrees F.) and holding there for various lengths of time. This, as may be noted, is the temperature that was found to remove or refine the coarse structure of the overheated rolled steel and the overheated casting.

Table 2.—Untreated Casting Heated to 840° C., Held There and Then Cooled Slowly.

Number.	Hours held at 840° C.	Effect on coarse structure.
10	2	Not effaced.
11	8	Not effaced.
12	16	Not effaced.
13	24	Not effaced.
14	32	Not effaced.

These results are summarized in the following conclusions:

1. The lower therapeutic temperature, at which there is rapid effacing of the coarse network ferrite caused by overheating at 1377 degrees C., is between 804 degrees and 840 degrees C., and hence probably slightly above Ac 3.

2. Ingotism is not cured in this steel, even by an exposure of 32 hr. to this temperature.

3. The upper therapeutic temperature, at which ingotism is cured rapidly in this steel, is between 1180 degrees and 1194 degrees C. (2156 degrees and 2181 degrees F.).

4. The lower therapeutic temperature of the de-ingotized steel casting is substantially that of overheated rolled steel of like composition.

5. The critical temperatures in the initial heating of an annealed steel casting are the same as those of the same casting after de-ingotizing. G. B. W.

The Mechanical Engineers in England.—Sir Robert Hadfield, a member of the council of the Institute of Mechanical Engineers of Great Britain, was the bearer of an invitation to the American Society of Mechanical Engineers to hold a meeting in England in August, 1910. The board of the American society last week formally accepted the invitation. It has not yet been determined in what city the meeting will take place. It is probable that it will be Birmingham, Manchester or Sheffield.

In its monthly publication the McWane Pipe Works, whose foundries are at Lynchburg and Radford, Va., notes that in the business year ending with April its pipe production showed an increase of 4071 tons over the best previous year.

THE IRON AGE

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Old Material in Steel Production.

Special interest has been aroused in the position of iron and steel scrap by recent market developments. There is a confessed scarcity of material in the open market, and prices have been advancing sharply, with still higher prices predicted. Some dealers are short on their contracts with open hearth steel works and do not find enough material arising to meet their obligations. Heavy melting steel, upon which interest centers, is quotable for the average Pittsburgh delivery at $16.25, and for Chicago delivery at about $14.75. These prices are high, according to market precedents, since the Bessemer pig iron average for May was $14.94, Valley, and the basic average $14.12, Valley. Average prices for 1907, a year of high values, and 1908, a year of low values, were as follows:

	1907.	1908.
Basic pig iron, Valley	$20.93	$15.35
Bessemer pig iron, Valley	21.76	16.14
Heavy melting stel, Pittsburgh	17.22	14.00
Heavy melting steel, Chicago	15.08	12.45

Thus heavy melting steel at Pittsburgh was $3.71 below basic pig, Valley furnace, in 1907, and $1.35 below in 1908, while heavy melting steel at Chicago was $5.85 below Valley basic in 1907 and $2.90 below in 1908. Taking the present market for Valley basic at $14.25, melting steel at Pittsburgh is $2 higher, and at Chicago it is 50 cents higher, thus constituting an entire reversal of the position in either 1907 or 1908.

Even more striking than the position as to prices is the position as to supplies. The current outcome is generally regarded as insufficient; the dealers are short on current contracts, and as a rule the open hearth steel works have less than their customary reserves. The problem before buyers and sellers is to segregate, if possible, the influences which are temporary from those which are permanent, as it is pretty generally conceded that a permanent change of more or less importance has occurred in the scrap position.

The scrap market does not follow the course of the ordinary commodity markets in several respects. In pig iron, for instance, a marked advance in prices rarely occurs without finding consumers fairly well covered for several months at least. The buyers have foreseen the contingency and have covered themselves, although in so doing they may help along the advance in prices. With scrap there is less opportunity to buy ahead on a rising market, and an advance does not usually find consumers as well covered in scrap as in pig iron. Again, on an advanced market accumulations of pig iron are generally worked off in ample time, while in scrap they are frequently held a little too long. In pig iron the tendency of accumulations is to temper the advance, while in scrap it is not infrequently the case that accumulations tend instead to precipitate the decline. These have been the tendencies as made by the temper of holders or sellers of scrap, while their full effect has been diminished by the fact that the amount of old material used by open hearth steel works has been to an extent subject to their dictation. The proportion of scrap used in the melt could be varied, and the tonnage of open hearth steel produced was less than the tonnage of Bessemer. A change has occurred in that open hearth steel production exceeds the Bessemer production, and it is inconvenient for steel producers to reduce the percentage of scrap. Accordingly there is somewhat more room than formerly for violent fluctuations in the price of scrap relative to other commodities.

Scrap differs from pig iron in another important respect, in that while it is in a sense produced its production is not directly at the option of the producer. It is a by-product in larger operations, and it requires a longer time than pig iron to pass from producer to consumer. When the general rate of the steel industry slows down, as it did at the close of 1907, the production of scrap proceeds apace, while consumption falls off promptly. That was the case in the sharp recession in activity a year and a half ago, large quantities of scrap falling into the market and depressing prices to an unduly low level.

On a general resumption in activity the demand for scrap increases first and the supply afterward, so that a temporary scarcity is produced, and this feature constitutes a part of the situation to-day. That portion of the situation will right itself in time, as the increased quantity of steel which is being made comes to the consuming point, being worked up, with the production of some scrap, for final consumption, and releasing in various ways old material which is to be replaced.

These influences which have tended to advance scrap are quite temporary in their nature. There is another influence which may be more or less permanent. As steel was used in 1906 or 1907 a certain total amount of old material came out. There is at present a fairly close approach to the 1906-7 rate of steel production, but the distribution is altogether different. In 1906-7 the railroads were taking a large percentage of the output of the steel industry, and it is well known that the railroads are at such times large producers of old material. The proportion of the total iron and steel production which goes to the railroads has been variously estimated at from 40 to 60 per cent. For 1906-7 40 per cent. is probably not far from the mark. At the present time pig iron is being produced at more than 80 per cent. of the 1906-7 rate, while open hearth steel output is probably fully up to the rate in those years. The railroad consumption of iron and steel has dropped off at least one-half, while the railroad production of scrap has declined more than that. Evidently, then, consumption and production of scrap are in altogether changed relations, production being much lower than formerly relative to consumption.

The market for grades of scrap used in open hearth steel manufacture is much more sensitive than is popularly supposed. In 1906 and 1907 production of open hearth steel ingots and castings averaged over 11,000,000 tons, in 1908 the output was nearly 8,000,000 tons, and this year the output promises to exceed 10,000,000 tons. The ordinary estimate is that the open hearth furnace consumes about half scrap and half pig iron, and comparisons of the production of basic pig iron and of basic open hearth ingots and castings tend to bear out the

supposition, so that in normal years one would look for the consumption of more than 5,000,000 tons of scrap in open hearth practice. Even fairly large fluctuations in the scrap supply should not, on this basis, leave any great impress on the market, because a change from 50 per cent. scrap to 40 per cent. scrap would decrease the demand by a million tons or more.

This, however, is not the position at all. The 5,000,000 tons, if that is the quantity, is not old material, traded on the market. The great bulk of it is new material, produced in the works which consume it. The amount of old material sold to open hearth steel works in a year undoubtedly falls far short of a million tons, and may not greatly exceed half a million tons. It is not sold uniformly to all steel works. Producing plants which make the bulk of the country's total open hearth steel output do not buy any old material at all on the market. The buyers are relatively few, but they are steady buyers if they can find the material at all, and it is upon this relatively small movement that the brunt of the duty falls to take care of variations affecting the whole industry with its large tonnage. The increase in open hearth operations has been enormous. The annual production of open hearth steel ingots and castings did not reach 1,000,000 tons until 1895; seven years later, in 1902, it passed 5,000,000 tons, and four years later, in 1906, it passed 10,000,000 tons. The earlier growth in demand was met by the increased supplies available. Old material, which for years had lain uncalled for, was gathered up and new scrap formerly used liberally in the Bessemer converter was diverted to the open hearth furnace. Naturally the time came when no further relief could be expected from these quarters. The annual outcome of old material increases, but not as rapidly as does the production of open hearth steel. If the average length of time in which iron and steel stays in use does not change, the outcome of old material increases substantially as the total production of pig iron has increased. If the average period of first use is 20 years, then the outcome of old material increases as pig iron was increasing 20 years ago. Pig iron production has increased pretty steadily, following closely the rule of a doubling in an average of 10 years. Open-hearth steel production has increased so rapidly that no rule can be formulated. The production was multiplied by 10 in the 12 years, 1895 to 1907.

Information as to the amount of old material hitherto used by the open hearth steel making industry may be sought from the production statistics, but conclusive information cannot be obtained. The comparison between the production of basic pig iron and basic open hearth ingots and castings is familiar, and shows that the tonnage of the latter runs about double that of the former. The difference might or might not be made up of new steel obtained from the open hearth and Bessemer steel works. A comparison of the production of steel making pig iron and steel products may be made, but leads to a rather startling negative result. The steel products are steel castings and rolled steel. Statistics of the latter have been available only since 1904, prior to which year the statistics of rolled steel and rolled iron were not separated. Certain allowances must, of course, be made, but it is convenient to present the fundamental statistics first. They are as follows, from 1904 to 1907, there being no rolled steel statistics prior to 1904, while it is preferable to omit 1908 as being a year having its own characteristics:

	Pig iron.—Bessemer, basic, spiegel and ferromanganese.	Bessemer and open hearth castings.	Rolled steel.
1904	11,801,209	318,885	10,253,297
1905	16,802,278	548,643	14,780,025
1906	19,159,692	752,492	17,401,911
1907	18,946,187	779,798	17,664,736
Totals	66,709,366	2,399,818	60,099,969

Adding the steel castings to the rolled steel we obtain 62,499,787 tons, and deducting this from the pig iron we get 4,209,579 tons. Probably few would have expected to find the difference in this direction. The orthodox idea would be that the output of steel products exceeded the output of pig iron. It requires a deal of explaining to get to the other side of the line and find room for the old material which it is a matter of common knowledge has been bought and consumed. In the direction of helping to explain, we must note that some ostensibly steel making iron was used in foundry practice, but the amount must have been relatively small. What is called "malleable Bessemer" is separately reported in the statistics. One might be disposed to deduct the tonnage of standard Bessemer and basic iron going into ingot molds, but what is left of the molds ultimately finds its way into steel and allowance should be made only for waste and for increase in the equipment of molds and stools. Allowance should be made for the loss of metalloids in Bessemer practice, which at 5 per cent. would be 600,000 tons a year. There is no similar loss in open hearth practice, for the general claim is that by the use of ore the tonnage of ingots is greater than the charge of pig and scrap, sometimes by several per cent. Allowance must be made for scale and other incidental losses, but for each per cent. we should find only 150,000 tons a year. On the other side it must be remembered there have been imports of ferromanganese and spiegeleise, averaging more than 100,000 tons a year, and that the steel works obtain new scrap which does not pass through the market at all. The "rolled steel" reported as produced contributes some scrap in the works in which produced and often contributes more as the result of a direct sale at the time the "rolled steel" is bought.

It is very difficult to make any definite estimate of the above factors and do much more than account for the million tons a year discrepancy which the tabulation showed. The losses of material in practice are probably larger than the authorities usually estimate, but on the whole it is evident that old material has really been but a small feeder to the open hearth steel industry. From that it necessarily follows that this source of supply cannot be depended upon to supply the increased demand now being realized or promised for the future. The growth of the open hearth industry has proceeded smoothly, largely by reason of its taking new scrap, which hitherto had gone into other channels; suddenly it exhausts that source of supply and must in future regulate itself by the new conditions, which are likely to keep old material at the actual value to the consumer. Hitherto the market value has been a compromise between this and the value to the original holder for the use to which it had been put—the latter value being practically nothing.

The American Brass Company has announced to its employees of all of the great plants in the Naugatuck Valley that they will be given a Saturday half holiday during June, July and August, and that all men who work the full 55 hours in any week will receive pay for 60 hours. The idea is not a new one, but it has seldom been carried out on so large a scale. It should pay in the greater efficiency of the plant's operating with a con-

tinuously full force. In the summer months there is a temptation to many workmen to take time off, and absenteeism may go to the point of serious impairment of producing power. The 5 hours' bonus should stand between many men and their inclination to be absent from their work.

The Steel Industry and Stock Speculation.

There is probably not a single person even remotely identified with the iron trade who has not been asked again and again during the past few weeks by friends and acquaintances to what extent the persistent rise in the steel stocks reflects a present or prospective improvement in the industry itself. We have no doubt that many have discouraged speculatively inclined friends and are smarting now under the reproaches apparently justified by the course of events so strikingly contrary to conservative councils. We have no concern with outsiders, who, determined to speculate, seek justification by asking advice from members of the iron trade. It is a far more important question to discuss whether the fluctuations in the different steel shares anticipate future developments in the industry itself—in other words, whether the tape discounts the future.

Broadly, the prosperity of the trade is measured by the earnings of the producers. When they are large, through a conjunction of a large volume of work and remunerative prices, every one shares in them more or less. Measured by that standard the iron industry is not at this time in a flourishing condition. While domestic consumption is good in those products which go chiefly to the farmer, it is only fair so far as the takings of collateral industries are concerned, and is poor from the standpoint of the purchases of the railroads. While the volume of business has been improving and promises to expand further it will take a long period before the active mills and the new plants recently completed or approaching completion are in full operation. The profits in many branches of the industry are below the vanishing point and are below the normal in nearly all others. The great majority of the producers are committed for a considerable time to come to deliveries at very low figures. That is the situation so far as the condition of the industry is concerned, with fair prospects for the balance of the year.

The feeling in the trade is that such an outlook does not justify a huge speculation in steel stocks—in fact, the fear is freely expressed that an awakening to the real conditions may bring about financial catastrophes which may cause a serious setback in that return to normal conditions which is regarded in the trade as the consummation most ardently to be desired.

Correct Weights and the Cost System.

The very active demand for scales for use in industrial works, which has continued without abatement since the beginning of the year, is attributed largely to the efforts of manufacturers to put their business on a more exact and economical basis. The depression has stimulated a careful search for leaks and the means of preventing them, and accurate scales constitute a very essential factor in a cost system, and one frequently neglected. Scales like every other exact mechanism require test and adjustment and repair at the hands of experts; only as they are accurate can the manufacturer have proper assurance as to weights of materials bought and goods sold and of parts as they pass through the factory in the process of manufacture. These details may be overlooked in the rush of flush times. One of the ultimate benefits of depression is the incentive to look after the little things which enter into costs to a more important extent than may be realized.

Competition Versus Co-operation in the Steel Industry.

We take pleasure in publishing the following communication, which reaches us from one of the veterans in the steel industry and one very high in its councils at the present time.—EDITOR *The Iron Age.*

In *The Iron Age* of November 28, 1907, appeared the following report of the remarks made at a dinner given by E. H. Gary, chairman of the United States Steel Corporation, on Wednesday, November 21, 1907, to representatives of the principal steel producing interests of this country:

"One by one the heads of the other great companies in brief speeches voiced the conviction that demoralization, harmful to all, must follow any efforts to capture an undue share of business or an invasion of a rival's territory. It was the unanimous opinion of all present that the underlying conditions are sound and that the recession which the industry is now experiencing will not be long continued. Emphasis was laid upon the fact by a number of the speakers that since prices of finished goods had not been materially advanced during the recent period of prosperity, therefore they should not now be reduced, and that consultation must precede future adjustments. They have not, as in the past boom times, risen to a point where prices checked consumption, nor would now a slaughter of values stimulate buying. The point was made by men long identified with the industry that stability of prices is the greatest consideration, from the standpoint of the permanent interests of the producer, and that buyers generally cordially approve it when they have the assurance that others do not have advantages over them. So unanimous was the agreement with the principles enunciated that practical means were quickly formulated for carrying them into effect."

The policy of co-operation thus established was from the very first condemned by many who doubted its practicability or its resulting benefit to the country if successful. Its advocates, however, still contend that if the policy had been supported in good faith by all adherents it would have eventually resulted in the restoration of normal buying, steady markets and general prosperity, accompanied by prices which would have yielded prices in excess of cost of production. It by no means follows that the views of those who were incredulous as to the possibility of successfully maintaining stable conditions by means of co-operation have been justified by the event. The policy was inaugurated at a time of general paralysis of business, due to the effects of the financial panic of 1907, and despite higher costs of production the market during the year 1908 was maintained at a level which provided moderate profits to the manufacturers and enabled the maintenance of the same scale of wages as during the preceding period of prosperity. Conditions steadily improved under the influence of stable prices, and although the consumption of steel by the railroads was necessarily reduced to a minimum (owing to their inability to procure the necessary capital for extensions or even for important renewals) there was a steady and gratifying increase in the buying in other lines. Unfortunately, however, there was a persistent campaign conducted in a section of the press of the country in favor of lower prices, the claim being made that steel prices were being maintained at a higher level than was warranted by general market conditions and that buying was thereby restricted. Buyers began to doubt that the stability of prices would be maintained, and as a consequence the volume of buying was restricted to immediate requirements. Manufacturers who had until then been united as to the wisdom of maintaining

prices began to waver. Buying was still further restricted by the growing suspicion, fostered by the press, that a collapse of prices was certain and imminent. Under such circumstances it was perhaps not surprising that some manufacturers should have grown restive under the self-imposed restraint involved in the policy of co-operation and should have anticipated the expected collapse. The situation thus created rendered inevitable the abandonment, at least temporarily, of the co-operation policy, and the public announcement was not long delayed.

It was perhaps unfortunate that the adoption of the co-operation policy should have been during the strain of a great business depression. There had been at various times before co-operation between manufacturers in various lines of the steel industry, but generally during periods of prosperity, when there was little or no incentive to cut prices. It remained for a period of panic and unusual depression to apply the test to the policy of co-operation in the steel business generally, and the resulting failure was due to causes which do not necessarily discredit the policy or the wisdom of restoring it. It has been said that "steel is either a prince or a pauper." Under conditions of extreme competition this is inevitable, but experience has proved that with co-operation as the guiding policy steel need not be either a prince or a pauper, and stable conditions may be maintained to the mutual benefit of manufacturer, merchant, consumer and laborer. In Europe, particularly in Germany, experience has amply demonstrated the advantages of co-operation and the disastrous possibilities of unlimited competition. For many years excessive competition kept the steel industry in Germany down to the lowest levels of prices, wages and production. In recent years, however, there has been a marked improvement, due to the formation of the German Steel Works Union, which by combining in a single selling organization all the principal producers of Germany has been able to maintain stability of prices in the home market, resulting in increased consumption, and at the same time to largely increase trade with foreign markets. In this connection it is well to note a radical difference between the conditions prevailing in Germany and those which are possible in this country. The right of manufacturers to combine for the promotion of their mutual interests is not only recognized but is encouraged and fostered by the German Government, the manufacturers being thereby enabled to maintain a higher level of wages and to provide pension funds for labor, and by the judicious use of export bounties to secure a much larger share of the export trade than would otherwise be possible. This is shown by the fact that Germany now exports some 4,500,000 tons per annum.

The formation of the German Steel Works Union and the successful results accomplished by it were largely due to the efforts of the banking interests of Germany, who realized that it was essential to the welfare of the railroad and other interests, allied with or dependent upon the steel industry, that ruinous competition among steel manufacturers should be discouraged. Similar results largely actuated the financiers who organized the United States Steel Corporation and other large consolidations of manufacturing interests in this country. In Germany the establishment of the Steel Works Union rendered possible the resumption of operations by mills built during the years 1900 to 1902, but which had lain idle for several years following the collapse of 1903, as orders, whether plentiful or scarce, were allotted by the union to its various constituent companies in proportion to their manufacturing capacity and requirements. Similarly, the remarkable increase in the production and consumption of steel in this country, accompanied by general prosperity and high wages during the period from 1901 to 1907, was largely due to the stability of prices which resulted from the large consolidations of manufacturing and the consequent elimination of competition, which had been carried to a point where it threatened disaster to the entire industry.

One of the most frequent effects of price wars is exemplified in the building of new plants and extension of existing manufacturing facilities. In such times manufacturers, for aggressive purposes, plan extensions to their plants and equipment which are not justified by any actual or prospective demand. The usual result, in many cases, is that the unnecessary additions remain idle for years and act as a drag on the returning prosperity of the industry, as all attempts to employ productive capacity in excess of consumption inevitably involve abnormally low prices and correspondingly low wages.

Notwithstanding that a large tonnage has been booked at prices which, there is every reason to believe, are close to the net cost of production, there has been no such general resumption of buying for immediate consumption as was confidently predicted by those who advocated a return to open competition and lower prices. While it is true that a certain amount of business, which was held back because of the agitation for lower prices, has been placed, the uncertainty of the market still acts as a deterrent to normal buying, which will only be resumed when the confidence of buyers in the stability of market conditions has been generally restored. So long as manufacturers continue to scramble for all the business in sight and to accept whatever prices may appear to be necessary to meet real or assumed competition the volume of business will continue to be restricted to the known requirements of the immediate future and to such speculative purchases as may be induced by an abnormally low level of prices. Such speculative business, however, cannot be of advantage either to the manufacturer or to the trade generally. It is manifestly artificial and does not reflect actual demand from consumers, but is rather in anticipation of more or less problematical future requirements. When such business as is obtainable is largely of speculative character there is always a tendency on the part of buyers to whom prices may appear attractive to make purchases in excess of what they will eventually be able to dispose of to advantage, the result of which is to create further weakness in the market when the pressure of obligations compels the disposal of accumulated stocks.

One of the principal results of the recent collapse in prices was an immediate reduction in the wages paid by a number of important interests, with the consequent curtailment of the buying and consuming power, not only of the workmen directly affected, but of a much larger number of people directly or indirectly dependent upon them. Several companies have already announced important extensions to their plants and increases of equipment, the inevitable result of which will be overproduction, followed by depression and low prices, or the closing wholly or partially of manufactured capacity, which might otherwise have been operated to the mutual benefit of all concerned.

A comparison of conditions during the operation of the policy of co-operation with those now prevailing cannot be satisfactory to those who have so persistently advocated a return to open competition. While it is true that last year the volume of business was less than during the period immediately preceding the panic, fair prices were secured, the level of wages was maintained and conditions were gradually but surely returning to a normal basis. To-day we have the spectacle of some mills working at high pressure to fill orders at prices which cannot possibly be profitable, while others are either closed entirely or only partially operated. Labor is undoubtedly dissatisfied with the reductions in wages and dissensions of a disastrous character have only been avoided by the scarcity of employment. That these conditions, as compared with those of last year, can be regarded with satisfaction by those chiefly responsible for the change is doubtful.

The Braddock Machine & Mfg. Company, Braddock, Pa., is adding a steel casting department to its plant, which will be ready for operation about August 1. The S. R. Smythe Company, Pittsburgh, is installing an acid open hearth furnace, of 20 tons capacity. A building 50 x 124 ft. is being added to the foundry; a 15 x 50 ft. lean-to and a motor shed are also being built. A 20 or 25-ton electric traveling crane will be purchased. The company will continue to make gray iron castings, rolling mill and furnace machinery, rolls, &c.

CORRESPONDENCE.

Amorphous and Flake Graphite as Lubricants.

To the Editor: We observe on page 1435 of *The Iron Age* of May 6, 1909, an article with regard to the relative values of amorphous and flake graphite as lubricants which is so misleading as to constrain us to ask you to lay before your readers a few more facts bearing on this subject.

Among other statements, the article in question contains the following: "It is not conceivable that amorphous graphite or any graphite, for that matter, performs any function so long as it is moving about freely in the lubricant which is used to distribute it. It is only when the particles become attached to the metal surface that they begin to do their work." This is true, but in justice to the amorphous product the writer should have added that not only is this formation more adhesive and thus, according to the foregoing statement, a better lubricant than the crystalline or flake variety, but also capable of very much finer pulverization which, when used as a lubricant, is distinctly advantageous, in that its function is the filling in and evening up of those microscopical and friction producing inequalities which occur to a greater or less extent in even the most carefully finished bearings. Now then, since this filling in and evening up process is accomplished by the graphite becoming gradually deposited in these microscopical irregularities, we submit that the graphite which will most successfully perform the service—that is, fill in and even up these microscopic inequalities—must necessarily be of a microscopical degree of fineness in order to become deposited therein. It only remains to draw attention to the fact that crystalline or flake graphite, no matter how well and thoroughly pulverized, still remains in the form of fish scale-like flakes always visible to the eye, while amorphous graphite, being nonstructural, is susceptible of minute pulverization, and may be ground to a powder of impalpable fineness. Amorphous graphite, therefore, is for lubricating purposes superior to flake graphite, because it would be as easy for a camel to pass through the eye of a needle as for flakes of graphite, which are visible to the naked eye, to deposit themselves in such minute depressions as may be detected only with the aid of a powerful microscope, and which, as above stated, are always present to some extent in all bearings, no matter how carefully finished they may be. Then, too, owing to its more adhesive nature, powdered (or amorphous) graphite "stays put" better than the flake product—that is, it does not rub off so easily, but after working into all these little inequalities stays there and evens them up, the result being smooth, mirrorlike and almost frictionless surfaces. A simple test by which one may readily compare the adhesive properties of these two formations of graphite is to take a pinch of each, rub it in the palm of the hand on a piece of paper or other convenient surface. It will be seen that while only a small proportion of the flake product adheres under friction (about 90 per cent. being dislodged by simply brushing, jarring or shaking) amorphous graphite is adhesive in the highest degree; in fact, the more one rubs and the greater the frictional pressure the more effective the lubrication.

The writer of the article we are criticising would also have your readers infer that while the adulteration of amorphous graphite is easy, it is quite impossible to manipulate graphite of the flake variety to the detriment of the user. This, of course, is absolutely false, since it is quite as easy to adulterate the one as the other if the manufacturer has it in his mind to do so. On the other hand, we will say that it is just as easy to detect adulteration of the one form as the other.

THE UNITED STATES GRAPHITE COMPANY,
H. C. WOODRUFF, GENERAL MANAGER.
SAGINAW, MICH., June 3, 1909.

The statement of the American Railway Association shows a decrease from 284,292 idle freight cars in the United States and Canada on May 12 to 272,650 cars on May 26.

An Exhibit of High Speed Steels.

Wheelock, Lovejoy & Co., New York and Boston, are conducting at the plant of Gould & Eberhardt, Newark, N. J., a demonstration and exhibit of tool steel manufactured by the Firth-Sterling Steel Company, McKeesport, Pa. The exhibit, which was begun on June 1, will continue until June 12 and is one of a series conducted in various cities. In addition to the demonstration of the Firth-Sterling steels, there are exhibits of various machines and appliances in which the steels are used, a good sized section of one floor of the Gould & Eberhardt plant being occupied. Among the machines shown is a Gould & Eberhardt 16-in. double triplex quick stroke extension base crank shaper operating with tools made of Firth-Sterling blue chip steel.

Another exhibit is the Powell 24-in. accelerating cut planer, on which the demonstrator planes cast iron at a cutting speed of 130 to 140 ft. per minute and making a ⅝-in. cut, ⅛ to ¼ in. feed, 5 ft. in length. As the planer is of an entirely new type some details will be of interest: Its chief advantage is that its cutting speed can be automatically increased during the cutting work, adding over 40 per cent. to the efficiency of the old type machine. The tool enters the work at a cutting speed much below that generally adopted for the different materials, and after it has traveled about 1 in. the accelerating speed dog strikes a tappet, which by means of a belt shafting cam throws the belt from the initial pulley to the accelerating pulley, the rim velocity of which is the same as that of the original speed pulley. The accelerating pulley is loose on the driving shaft, having a gear on its hub engaging with differential gearing attached to the bed plate, and these gears in turn engage a gear keyed to the driving shaft. The ratio of gears increases the speed of the driving shaft from two to three times the initial speed. As the driving shaft increases in speed it draws away from the initial pulley, which now becomes loose, in a perfectly increasing ratio, that increases the cutting speed of the planer, as determined by the ratio in the differential gears. This travel at a high rate of speed continues to a point just before the end of the cutting stroke, where the speed is automatically reduced back to the initial speed just before the reversing dog from cut to quick return takes effect.

A gas furnace built by the American Gas Furnace Company, Elizabeth, N. J., is being used to demonstrate how taps, holes, dies, &c., made of blue chip steel can be hardened without changing their shape by the Wheelock, Lovejoy & Co. process. This, as described in *The Iron Age* of October 29, 1908, employs a barium chloride bath in a standard gas hardening furnace. A milling machine, especially adopted for die makers' work, manufactured by the E. C. Bliss Mfg. Company, Providence, R. I., is shown cutting dies with tools made of blue chip steel. There is a large exhibit of taps, dies, &c., made of this steel and other tools manufactured from various grades of high speed steels, also forgings and a general line of the products of the Firth-Sterling Steel Company, including blue chip circular saws. Some of the machines shown use cutting tools made by the O. K. Tool Company, Shelton, Conn.

The American Vanadium Company, Pittsburgh, will have a display at the annual convention of the Railway Master Mechanics and Master Car Builders' associations on Young's Pier, at Atlantic City, N. J., June 16 to 23. In space 211 the company will show all types of vanadium steel, cast iron, cast steel, bronze and brasses, illustrating the practical application of vanadium products in railroad, machinery, automobile and other construction. The company will be represented by Joseph M. Flannery, general manager; J. Kent Smith, chief metallurgist; G. L. Norris, engineer of tests; John A. Drain, steel expert; C. L. Hastings, sales department, and W. J. Bird, assistant to general manager.

The Moran Company, Seattle, Wash., will, on July 1, remove to its own office building on First avenue, South.

PERSONAL.

A. J. Moxham of the E. I. Du Pont du Nemours Powder Company, Wilmington, Del., has gone abroad.

Julian Kennedy, Pittsburgh, Sheffield Scientific School, 1875, received the honorary degree of doctor of engineering from Stevens Institute of Technology, Hoboken, N. J., at its 37th commencement, June 3. In addressing the graduating class, Mr. Kennedy said that it is much easier to find among technical graduates good designers of machinery or competent mathematicians than persons who can write a sound contract or even a good business letter. He added that they would find that the nontechnical work in the curriculum would grow in value to them as they got farther away from commencement.

J. G. Rittenhouse, Jr., has resigned as Philadelphia sales agent of the Cambria Steel Company, after nearly 30 years' service, desiring to retire from active business. Fred W. Coxe, who has been connected with the company since 1879, succeeded Mr. Rittenhouse, June 1, and M. C. Edwards was appointed assistant sales agent for merchant steels in the Philadelphia territory.

Axel F. Wahlberg, general manager of the Fagersta Steel Company, Fagersta, Sweden, who has been in the United States for several weeks, sailed from New York June 5 on the Deutschland.

Joseph G. Butler, Jr., vice-president and general manager of the Brier Hill Iron & Coal Company, has been elected president of the Chamber of Commerce, Youngstown, Ohio. Thomas McDonald, general superintendent of the Ohio works of the Carnegie Steel Company, is second vice-president.

George E. Haring has been appointed superintendent of the Ramapo Iron Works plant at Hillburn, N. Y., succeeding A. W. Wright.

The itinerary of James W. Van Cleave, St. Louis, and James A. Emery of the Citizens' Industrial Association, who are visiting Pacific Coast cities and addressing metal trades associations, en route to Alaska, is as follows: Spokane, June 5; Portland, June 10; Tacoma, June 12; Seattle, June 14. On their return from Alaska they will address meetings of employers at Victoria and Vancouver.

Wm. Kent has resigned as general manager of the Sandusky Foundry & Machine Company, Sandusky, Ohio.

D. G. Clark has been admitted as a partner in E. S. Jackman & Co., Chicago agents of the Firth-Sterling Steel Company. The firm was formed one year ago by E. S. and D. E. Jackman, the former of whom has now been in the tool steel business for 27 years.

Arthur C. Hoefinghoff, sales manager of the Heald Machine Company, Worcester, Mass., has recovered from the effects of a recent operation for appendicitis.

Walter A. Fairchild, New Haven, Conn., formerly with Denman & Davis, has become the Connecticut representative of Dilworth, Gilbert & Towne, Inc., New York, mill agents and dealers in merchant iron and steel and tool steel.

R. W. Anderson, formerly assistant superintendent of the open hearth department at the South Works of the Illinois Steel Company and later connected with the sales department of the same company, has accepted a position with the Lackawanna Steel Company as superintendent of open hearth works. On his departure from Chicago Mr. Anderson was presented with a silver service by his associates.

E. V. d'Invilliers, mining engineer, of Philadelphia, has gone abroad.

Among the arrivals on the French liner Provence was Dr. Paul Héroult of La Praz, Savoie, who has gone to Chicago, where his process is now being introduced.

Judge E. H. Gary, chairman of the United States Steel Corporation, will give a dinner on June 19 to Sir Robert Hadfield, past president of the Iron and Steel Institute, and to Dr. Freiherr von Bodenhausen, a member of the firm of Fried. Krupp A. G. at Essen a. d. Ruhr.

John Fritz has presented Lehigh University, South Bethlehem, Pa., with a completely equipped engineering laboratory at a cost of $50,000. The announcement was made at the annual meeting of the Alumni Association of the university last week.

Alvin D. Davis of the Buffalo office of the Cambria Steel Company has been appointed Buffalo sales agent of that company, to succeed F. W. Coxe, who has taken the position of sales agent for the company at Philadelphia. For a number of years Mr. Davis was connected with the general offices of the company at Johnstown, Pa.

Dr. Richard Cockburn MacLaurin was inducted into office as president of the Massachusetts Institute of Technology, Boston, June 7, succeeding Acting President Arthur A. Noyes.

Lee Phillips, formerly of the Iron City Heating Company, Pittsburgh, is now connected with the sales department of the National Radiator Company, Johnstown, Pa., taking care of the trade in the Pittsburgh District.

Charles F. Rand, president of the Spanish-American Iron Company, leaves for Cuba this week.

George G. McMurtry will probably sail on the new liner George Washington early in July.

J. V. W. Reynders, vice-president of the Pennsylvania Steel Company, Steelton, Pa., goes abroad this week.

Pennsylvania Engineers' Convention.

HARRISBURG, PA., June 9.—Engineers from all over the State are assembled here to-day for the opening of the three-day convention of the engineers of Pennsylvania, called for the purpose of forming an organization. The sessions are being held in the State Capitol. Among the subjects to be discussed is a legislative bill providing for examination of engineers, a code with legislative backing, and a State Board of Examiners of Engineers along lines of those adopted for the medical profession. The call was issued by the Engineers' Society of central Pennsylvania, of which F. Herbert Snow, chief sanitary engineer of the State Department of Health, is president.

The list of speakers includes the following: Archibald Johnston, vice-president of the Bethlehem Steel Company; F. Herbert Snow, chief sanitary engineer of the Pennsylvania Department of Health; H. H. Stoek, editor of *Mines and Minerals*, Scranton, Pa.; Daniel B. Luten, Indianapolis, representing concrete bridge work; P. McNevin Bennie, Fitzgerald & Bennie, Niagara Falls, N. Y.; E. T. Adams, Allis-Chalmers Company, Milwaukee; E. A. Sterling, representing Pennsylvania Railroad tie preservation work; Nathan Hayward, engineer of construction, Bell Telephone Company, New York; Frederick Darlington, Westinghouse Electric & Mfg. Company, Pittsburgh; George A. Johnson and Frank A. Barbour, consulting engineers, New York; Lieut.-Col. H. F. Hodges, assistant engineer, Isthmian Canal Commission; Dr. J. T. Rothrock, president Pennsylvania State Forestry Commission; James Owen, New York, recently in charge of paving and road work in New York and New Jersey; Dr. Alva Agee, United States Department of Agriculture; J. H. Holmes, United States Geological Survey; John Birkinbine, president Pennsylvania State Water Supply Commission; J. G. Callan, General Electric Company; Arthur P. Davis, chief engineer United States Reclamation Service. An industrial exposition is held in connection with the convention.

The Porter Metal Mfg. Company is demonstrating at its office, 707 Perry Building, Philadelphia, Pa., a new automatic weighing machine. It operates on a lever balance principle, the weighing pan revolving and automatically discharging the material weighed into a suitable receptacle. The cut-off device is positive, the dribble discharge being checked by a vertical slide. Portions ranging from 1 to 5 lb. are accurately weighed and automatically counted, and the machine will be made suitable for a range between 1 and 10 lb., while larger machines will be constructed for weighing grain, coal, ore, cement and other materials. Designs for a standard machine for commercial purposes are now about completed and the manufacture of the device will be begun in the near future.

Pig Iron Production.

Marked Increase by Steel Works.

Merchant Furnace Output Reduced in May.

The pig iron statistics for May show that while steel making iron was produced at an increased rate, merchant pig iron output was curtailed. The number of merchant furnaces active June 1 was four less than on May 1, while the steel works furnaces in blast were 15 more on June 1 than one month previous, making a net gain of 11, or from 222 to 233. The production in May was 1,880,098 tons of coke and anthracite iron, or 60,649 tons a day, against 1,738,877 tons in April, or 57,962 tons a day—showing about 2700 tons increase in the daily rate, or 4.7 per cent. In May the steel works furnaces produced iron at a daily rate about 4100 tons more than in April, while the merchant furnace product was at a daily rate about 1400 tons less than in April. The large number of steel company furnaces going in in May, with an average capacity per furnace much greater than that of the merchant furnaces which went out last month, brought a sharp advance in weekly active capacity June 1 over that of May 1, or from 412,000 tons to 442,000 tons. Thus the yearly rate of production June 1 was about 23,000,000 tons, or more than 1,500,000 tons greater than that of May 1.

Daily Rate of Production.

The daily rate of production of coke and anthracite pig iron by months, beginning with January, 1908, is as follows:

Daily Rate of Pig Iron Production by Months.—Gross Tons.

	Steel works.	Merchant.	Total.
January, 1908	21,432	12,286	33,718
February	25,717	11,446	37,163
March	27,145	12,474	39,619
April	24,185	14,104	38,289
May	24,505	13,098	37,603
June	23,923	12,521	36,444
July	25,762	13,525	39,287
August	28,952	14,899	43,851
September	31,117	16,183	47,300
October	32,217	18,337	50,554
November	32,705	19,890	52,595
December	35,172	20,986	56,158
January, 1909	35,983	21,992	57,975
February	38,367	22,609	60,976
March	36,811	22,421	59,232
April	36,436	21,526	57,962
May	40,531	20,118	60,649

May Product by Districts.

The table below gives the production of coke and anthracite furnaces in May and the four months preceding:

Monthly Pig Iron Production.—Gross Tons

	January. (31 days)	February. (28 days)	March. (31 days)	April. (30 days)	May. (31 days)
New York	128,773	110,392	117,219	91,283	112,669
New Jersey	21,144	19,518	19,577	19,798	19,836
Lehigh Valley	53,144	50,762	49,072	46,463	58,176
Schuylkill Val.	56,449	51,447	58,169	54,004	52,755
Lower Susquehanna and Lebanon Val.	49,691	49,379	45,150	45,973	52,687
Pittsburgh Dis.	416,643	388,031	407,148	403,981	446,656
Shenango Val.	94,741	84,609	85,321	77,434	103,783
West. Penn.	107,060	116,711	139,873	129,543	128,413
Md., Va. and Kentucky	56,464	52,257	56,402	63,311	60,143
Wheeling Dis.	54,176	53,735	58,156	46,696	63,980
Mahoning Val.	158,407	141,405	160,357	171,107	171,811
Central and North Ohio.	129,174	124,650	126,719	119,226	125,554
Hocking Valley, Hanging Rock and S. W. Ohio	44,410	42,772	48,521	43,841	38,995
Mich., Minn., Mo., Wis., Colo.	67,830	60,512	72,481	55,995	54,813
Chicago Dis.	177,663	196,061	219,009	211,776	250,363
Alabama	149,280	135,374	143,407	136,909	119,823
Tennessee, Georgia and Texas	32,511	29,725	29,613	21,537	19,641
Totals	1,797,560	1,707,340	1,836,194	1,738,877	1,880,098

Among furnaces blown in in May were: One Colorado, one Lackawanna at Buffalo, in the Lehigh Valley; three Edgar Thomson and one Donora in the Pittsburgh District, one South Sharon and Atlantic and Hall in the Shenango Valley, on Paxton, and one Steelton in the Lower Susquehanna Valley, two Bellaire, Mingo, Benwood and Riverside in the Wheeling District; one Central at Cleveland, Madeline in the Chicago District, one Bay View in Wisconsin, Mattie and one Ohio in the Mahoning Valley, and two Bessemer in Alabama.

The list of furnaces blown out last month includes the Detroit Furnace Company's stack, Keystone in the Schuylkill Valley, one Carrie in the Pittsburgh District, Rebecca in western Pennsylvania, one Colebrook in the Lebanon Valley, Alleghany in Virginia, Norton in Kentucky, Hamilton in southwest Ohio, Struthers in the Mahoning Valley, Standard in Tennessee, Central, Williamson, Woodstock, and three Ensley in Alabama.

Production of Steel Companies.

Returns from all plants of the United States Steel Corporation, the Cambria, Pennsylvania, Maryland, Lackawanna, Wheeling, Republic, Youngstown Sheet & Tube, Jones & Laughlin, La Belle, Bethlehem, Calumet, Inland, Colorado and Tennessee (Ensley) companies show the following totals of product month by month. We give separately a statement of the output of spiegeleisen and ferromanganese (as well as ferrosilicon), which is included for each month in the total production:

Production of Steel Companies.—Gross Tons.

	Pig.—Total production.—			Spiegeleisen and ferromanganese.	
	1907.	1908.	1909.	1908.	1909.
January	1,406,397	664,415	1,117,823	20,254	12,325
February	1,317,923	745,802	1,073,363	9,402	10,046
March	1,424,827	841,502	1,140,553	13,750	23,743
April	1,446,788	725,548	1,093,092	12,363	22,478
May	1,470,080	759,674	1,256,448	17,823	20,834
June	1,457,230	717,689	.....	15,958	....
July	1,452,557	798,639	.....	10,250	....
August	1,445,685	897,052	.....	14,932	....
September	1,417,153	933,514	.....	8,938	....
October	1,514,521	996,481	.....	12,174	....
November	1,084,114	981,167	.....	15,882	....
December	659,459	1,090,339	.....	6,510	....

The number of active furnaces of the United States Steel Corporation and of the independent steel companies at the beginning of each month since January appears below:

	Steel Corporation.	Independent steel companies.
Furnaces in blast February 1	62	49
Furnaces in blast March 1	65	45
Furnaces in blast April 1	66	39
Furnaces in blast May 1	68	42
Furnaces in blast June 1	77	48

The Steel Corporation actually gained 11 in active furnaces in May, but two of these furnaces (at Bessemer, Ala.) produce foundry iron for the market, and therefore are not included in the above comparison which relates to furnaces making pig iron for connected steel works.

A Record of Active Capacity.

The active weekly capacity in coke and anthracite iron has shown the following fluctuations since January 1, 1906, the figures representing gross tons:

	Capacity per week.		Capacity per week.
June 1	442,446	September 1	507,768
May 1	412,010	August 1	513,471
April 1	409,217	July 1	528,170
March 1	420,807	June 1	523,220
February 1	414,497	May 1	524,538
January 1, 1909	401,994	April 1	496,456
December 1, 1908	381,102	March 1	511,035
November 1	362,685	February 1	492,359
October 1	337,925	January 1, 1907	507,397
September 1	313,112	December 1, 1906	513,860
August 1	284,590	November 1	500,580
July 1	264,452	October 1	469,665
June 1	259,284	September 1	441,426
May 1	268,674	August 1	449,908
April 1	264,890	July 1	460,570
March 1	267,437	June 1	472,622
February 1	241,925	May 1	484,031
January 1, 1908	235,152	April 1	484,240
December 1, 1907	347,372	March 1	479,737
November 1	491,436	February 1	482,156
October 1	511,397	January 1, 1906	463,673

Capacity in Blast June 1 and May 1.

The following table shows the weekly capacity of furnaces in blast June 1 and May 1, the furnaces blown

in in May being rated on the records of their previous performance:

Coke and Anthracite Furnaces in Blast.

Location of furnaces.	Total number of stacks.	June 1. Number in blast.	June 1. Capacity per week.	May 1. Number in blast.	May 1. Capacity per week.
New York:					
Buffalo	15	10	22,736	9	20,547
Other New York	7	3	4,058	3	3,719
New Jersey	8	3	4,480	3	4,619
Spiegel	2	0	0	0	0
Pennsylvania:					
Lehigh Valley	25	13	12,365	12	11,168
Spiegel	3	2	770	2	810
Schuylkill Valley	15	7	10,528	8	12,602
Low. Susquehanna	7	5	6,636	3	4,033
Spiegel	1	1	625	1	578
Lebanon Valley	10	4	4,650	5	5,702
Pittsburgh Dist	48	38	102,760	33	90,458
Spiegel	2	2	1,631	3	2,961
Shenango Valley	20	12	25,151	9	18,980
West. Penn	27	15	28,994	17	30,366
Maryland	4	2	4,613	2	4,768
Wheeling Dist	14	9	20,860	4	10,964
Ohio:					
Mahoning Valley	20	16	42,994	15	40,582
Central and Northern and Michigan	22	14	33,036	13	30,217
Hocking Val., Hanging Rock and S. W. Ohio	15	11	8,421	12	10,228
Illinois and Indiana	27	20	56,224	20	52,419
Spiegel	2	2	1,694	1	895
Minnesota and Wis.	7	5	5,936	4	5,487
Missouri and Colorado	7	4	7,077	3	5,262
The South:					
Virginia	23	10	6,811	10	7,931
Kentucky	5	1	714	2	2,036
Alabama	46	18	24,608	22	31,945
Tennessee	18	6	4,074	6	4,433
Georgia and Texas	3	0	0	0	0
Totals	403	233	442,446	222	412,010

The Philadelphia Foundrymen's Association.

The regular monthly meeting of the Philadelphia Foundrymen's Association, being the last before the summer recess, was held at the Manufacturers' Club, in that city, Wednesday evening, June 2, President Thomas Devlin in the chair. The report of Walter Wood, chairman of the Pig Iron Specification Committee, was read by the secretary. It stated that the specifications adopted at the American Foundrymen's Association convention at Cincinnati were practically as agreed upon by the committee, representing the Philadelphia and the Pittsburgh Foundrymen's associations, the American Foundrymen's Association and the American Association for Testing Materials. They were printed in full in *The Iron Age* of May 27, page 1687.

Permanent Molds.

Several papers were presented for discussion. Edgar A. Custer, president of the Tacony Iron Works, Tacony, Philadelphia, read a paper on "The Production of Duplicate Castings in Iron Molds." Mr. Custer traversed in part the ground covered by his paper before the American Foundrymen's Association at Cincinnati in May, printed in *The Iron Age* of May 20. He referred to the fact that the work dealt with so far in the operations of the Tacony Iron Company has not exceeded 1½ in. in section, ranging down to ⅛ in. thick. In the use of permanent molds the designer, the chemist and the engineer play the greater part. The main duty of the foundrymen proper becomes one of providing iron at a suitable heat in the proper quantity. That this method of making castings means a separation of the permanent mold foundry from the foundry that works in sand is a foregone conclusion. The process, as a whole, rests upon the following facts:

1. Molten iron does not chill until after it has set.
2. That the shrinkage does not become serious until some time after the casting has become solid.
3. That chilling molten iron to the point of setting and then removing it from the mold produces an iron that is homogeneous, and therefore free from shrinkage strains.
4. The process further rests upon the assumption that any casting that can be poured successfully in a sand mold can be just as successfully poured in a permanent mold, when that mold is properly designed as to mold shape and size and character of gates.

There is little difficulty in getting castings that range from 1.75 to 2 per cent. silicon, provided the carbon is normal, but when a casting contains less than 1 per cent. silicon, even though the sulphur and phosphorus be extremely low, the shape and character of the gates must undergo an entire change. When iron of this character is further complicated by a low carbon—say, under 2.75 per cent.—successful pouring depends almost entirely upon the ability of the gate to carry the iron into the cavity. Castings in the shape of a box have been made in permanent molds, each angle being sharp and without fillets. There is absolutely no sign of any shrinkage, crack or weakness at the point of the angle.

The speaker gave illustrations of the various classes of castings made in permanent molds and called attention to the peculiar metal produced by chilling swiftly to the point of setting and then removing the casting. It not only takes a temper like steel, but takes and retains magnetism. These properties having been imparted to the casting, it is impossible to remove them except by remelting. In conclusion the speaker said:

> There is one more peculiarity that seems to be possessed by this metal, and that is, when the sulphur is high—say 0.1 or over—it loses its ability to retain magnetism. Why this is it is not in our field to explain. Some time ago Mr. Outerbridge noted the peculiar property of cast iron to "grow" when subjected to repeated heating and cooling, and the writer can testify to this curious phenomenon with iron cast in sand. When the molten iron is poured into a permanent mold, chilled swiftly to the point of setting and then allowed to cool normally, it seems to lose this property. A small casting, in which a thread was cut and carefully micrometered, showed a distortion of 0.002 in., after being repeatedly brought to a bright red heat and each time quenched in cold water.

Mr. Custer illustrated his paper with a number of lantern slides, following these with a motion picture showing the preparing and setting of a mold and cores, pouring off of the casting and removing it from the mold. Samples of T's, soil pipe traps, elbows and other castings were exhibited to show the class of work done in permanent molds. Discussion followed, in which the difference between the speaker's product and malleable iron was asked. This he was not prepared to explain. To a certain extent, he said, his method accomplished what the malleable iron manufacturer carried to completion. The combined carbon was changed to annealing carbon, analysis showing the carbon in a free amorphous state in his castings. The chemical composition had, within certain ranges, no effect on the production of his castings, although they might not in some instances be of satisfactory composition for machine shop operations; for instance, he had found that the best results, as far as the casting was concerned, were obtained with high sulphur iron.

Oxy-Acetylene Cutting in the Foundry.

G. W. Perry of the Industrial Supply & Equipment Company, Philadelphia, was then introduced and presented a paper on "The Oxy-acetylene Cutting-Off Torch as Applied to Foundry Practice." This subject was covered in an article by H. R. Cobleigh in *The Iron Age*, issue of January 7. Mr. Perry dwelt more particularly on the preparation of the gases for the successful operation of the apparatus. He also made a brief explanation and demonstration of the Twing electrical radiating, recording and indicating pyrometers, already described before the association and in *The Iron Age*, issue of August 1, 1907.

After a vote of thanks to Messrs. Custer and Perry for their interesting papers, adjournment until the September meeting was taken. Later luncheon was served in the dining room of the club.

The Engineers' Society of Pennsylvania, which has a fund to provide prizes for meritorious designs of engineering structures, is now offering prizes for the best design of ornamental poles for the support of lights and trolley wires. The competition is to close July 15, when the designs submitted will be opened by the board of award. Paul A. Cuenot, chairman prize committee, Engineers' Society of Pennsylvania, Harrisburg, Pa., may be addressed.

Copper Production in 1908.

A statement prepared by B. S. Butler, and just given out by the United States Geological Survey, shows that the production of copper in the United States in 1908 was 942,570,721 lb. This is the largest production ever made, exceeding that of 1906 by 24,765,039 lb. and that of 1907 by 73,574,230 lb., or 8.4 per cent. In the following table the production for 1908 is apportioned to the States in which the copper was mined. The total is made up of the fine copper content of blister produced and of the smelter output of ingot and anode copper from Michigan. The production of 1907 is given for comparison:

Production of Copper in the United States in 1907 *and* 1908.—*Smelter Output, in Pounds Fine.*

	1907.	1908.
Alaska	7,034,763	4,438,836
Arizona	256,778,437	289,523,267
California	33,696,602	39,643,835
Colorado	13,998,496	13,943,878
Idaho	9,707,299	7,256,086
Maine	.....	7,027
Massachusetts	.....	7,863
Michigan	219,131,503	222,289,584
Montana	224,263,789	252,503,651
Nevada	1,998,164	12,241,372
New Hampshire	.....	128,112
New Mexico	10,140,140	4,991,351
North Carolina	544,040	14,342
Oregon	518,694	271,191
Tennessee	19,475,119	19,710,103
Utah	66,418,370	71,370,370
Vermont	696,102	.....
Virginia	57,008	25,087
Washington	122,263	162,201
Wyoming	3,026,004	2,416,197
Maryland, Alabama and Georgia*	90,655	
South Carolina,† Texas†	.....	45,537
South Dakota†	.....	
Missouri and unapportioned	1,299,043	1,580,831
Totals	868,996,491	942,570,721

* Georgia did not produce in 1908.
† Not reported in 1907.

Refined Copper.

The production of refined new copper of domestic origin in 1908 was 875,849,129 lb., an increase of 91,577,702 lb., or 11.6 per cent., over the production of 1907. The total output of refined copper (exclusive of domestic scrap, &c.) by domestic refineries in 1908 was 1,094,700,123 lb. The details of production for 1907 and 1908 are shown in the following table:

Production of Refined Copper in 1907 *and* 1908.—*Pounds.*

	1907.		1908.	
	Domestic origin.	Foreign origin.	Domestic origin.	Foreign origin.
Electrolytic	592,326,608	245,062,814	656,179,349	218,716,268
Lake	178,534,141	.....	195,503,099	.....
Casting	13,410,678	3,182,006	24,166,681	134,726
Totals	784,271,427	248,244,820	875,849,129	218,850,994
Total output, domestic refineries	1,032,516,247		1,094,700,123	

The 1908 figures for domestic electrolytic include 26,786,485 lb. lake copper, which were refined electrolytically; those for 1907 contain 34,917,988 lb. lake copper.

In addition to this production of refined copper, 9,705,103 lb. (of which 2,551,077 lb. was electrolytic and 7,154,026 lb. casting) was recovered during the year by the regular copper refining companies of the country from domestic scrap, drosses, &c., and returns from practically all the known refiners of secondary material indicate that 13,508,574 lb. was turned out by them as casting copper and in alloys.

The production from secondary sources in 1908 was about 23,000,000 lb., as compared with about 60,000,000 lb. for 1907.

Stocks and Consumption.

Returns from all smelting and refining companies show that the following stocks of electrolytic, lake and casting copper were on hand at the beginning and end of the year:

Stock of Refined Copper.—Pounds.

January 1, 1908	125,745,796
January 1, 1909	121,876,759
Stocks decreased in 1908	3,869,037

Undelivered sales are excluded from these figures. Stocks carried by consumers and brokers have not been ascertained. In addition to the stocks of refined copper there were at smelters, in transit to the refineries, and at the refineries blister copper and material in process of refining to the amount of 175,254,659 lb. January 1, 1908, and 234,013,843 lb. January 1, 1909.

The apparent consumption of refined new copper in the United States in 1908 was about 480,000,000 lb. The method of deriving this figure is shown in the following table:

Consumption of Refined Copper in 1907 *and* 1908.—*Pounds.*

	1907.	1908.
Total refinery output	1,032,516,247	1,094,700,123
Stock at beginning of year	46,497,181	125,745,796
Total available supply	1,079,013,428	1,220,445,919
Refined copper exported	465,496,007	*618,613,842
Stock at end of year	125,745,796	121,876,759
Total withdrawn from supply	591,241,803	740,490,601
Apparent consumption	487,771,625	479,955,318

* Exports of pigs, bars, ingots, plates, &c., reported by the Bureau of Statistics, less 43,262,285 pounds of blister exported without refining.

In addition to the new copper consumed probably nearly all of the 23,000,000 lb. derived from secondary sources entered into the year's consumption.

NEWS OF THE WORKS.

Iron and Steel.

The Buena Vista Iron Company, Inc., which has a brown hematite iron ore property at Buena Vista, Va., with main office at Johnstown, Pa., has negotiations under way with the owners of mill property, and, it is reported, that after the consolidation of these interests plans will be taken up for building a blast furnace at Buena Vista.

The Union Drawn Steel Company, Beaver Falls, Pa., manufacturer of shafting, is operating its plant nearly full on double turn and has a fair amount of orders on its books.

Preparations are being made to remodel the blast furnace of Joseph E. Thropp, at Earlston, Pa. Improvements are still under way at the two furnaces at Saxton, Pa.

The Woodstock Iron Company blew out its Furnace A, at Anniston, Ala., May 31, for repairs, which will require most of this month for completion.

Repairs to the Alice Furnace of the Tennessee Coal, Iron & Railroad Company, Birmingham, Ala., are being rushed and the plant will probably be in operation within 30 days.

The 225-ton furnace of the Birmingham Coal & Iron Company, Vanderbilt, Ala., is to be blown out for repairs and the smaller furnace at that plant will be put in blast.

Operations have been resumed by the Southern Pipe & Foundry Company at North Birmingham, Ala., after a suspension for repairs.

The charcoal blast furace of the Standard Chemical Company, Ltd., Toronto, Canada, located at Deseronto, Ont., was successfully blown in May 27. Lake Superior ores will be used. The capacity of the furnace has been increased to 60 tons per day. J. P. Griffith, formerly of Manistique, Mich, is the manager.

Four of the six mills of the Atlanta Tinplate Company, Atlanta, Ind., have resumed operations, after four months' idleness, and the other two will be placed in operation as soon as workmen who left the city when the plant shut down have returned.

The recent report that the Sharon Steel Hoop Company, Sharon, Pa., would erect a large sheet mill in connection with its plant is officially denied. The company has no important improvements in contemplation at present.

Alfred Tomkins, general contractor and furnace builder, House Building, Pittsburgh, Pa., has received a contract from the Phillips Sheet & Tin Plate Company for all the coal fired combination, sheet and pair furnaces and all the gas annealing furnaces, with gas producer equipment, to be erected in connection with its new plant at Weir City, W. Va. Mr. Tomkins has built a number of furnaces for the American Sheet & Tin Plate Company in the Pittsburgh District, also the furnaces at the plant of the Phillips Sheet & Tin Plate Company at Clarksburg, W. Va., and is now completing a contract with the Standard Tin Plate Company, Canonsburg, Pa., for its furnaces and for the mill and engine foundations.

In May the two blast furnaces of the Youngstown Sheet & Tube Company at Youngstown, Ohio, made 31,401 tons of Bessemer iron, the largest output in any one month since these furnaces were built. Alice Furnace of this company at Sharpsville, Pa., is being prepared for blast and is expected to start not later than August 1.

General Machinery.

The Lewis Foundry & Machine Company, Groveton, Pa., builder of rolling mill machinery and exclusive makes of even

depth chilled rolls, has received an order for a No. 1 side cutting plate shear for the Ansonia, Conn., works of the American Brass Company.

The Keystone Driller Company, Beaver Falls, Pa., manufacturer of drilling machinery and deep well pumps, has a large number of orders on its books and is operating its plant to full capacity.

It is understood that the mechanical engineering department of the University of Arkansas, Fayetteville, Ark., contemplates installing new equipment in the shops and laboratory this summer.

C. C. Waller, Crupp & Tuffly Building, Houston, Texas, and associates, have under consideration the construction of car shops in that city, where an option has been taken on 20 acres of ground.

The Landis Tool Company, Waynesboro, Pa., has not yet decided upon the equipment it will purchase for its new machine shop, 80 x 100 ft.

The American Car & Foundry Company, St. Louis, Mo., which put in an extensive system of electric power transmission some time ago, is increasing its operation under that system by the purchase of more motors.

The Stoever Foundry & Mfg. Company, Myerstown, Pa., with sales office at 140 Cedar street, New York, has sold 12 of its No. 12 H pipe threading and cutting-off machines, motor driven, capacity 4 to 12 in., to Spang-Chalfant & Co., Pittsburgh, Pa., for the equipment of their new mill. This order was received through its Pittsburgh agent, the Brown & Zortman Machinery Company. The Stoever Foundry & Mfg. Company states that it is running full at the factory and has very little if any machines in stock.

The Seattle Car Mfg. Company, Seattle, Wash., is a recent buyer of electric motors.

A number of electric motors are to be added this year to the works of the Elyria Iron & Steel Company, Elyria, Ohio.

The Morgan Engineering Company, 165 Broadway, New York, has closed the contract with the Vermont Marble Company for one 50-ton gantry crane, total span 160 ft., main span of crane 60 ft., with two 50-ft. cantilevers. This crane is to be used for storing marble blocks.

The Intercolonial Railway of Canada will install in its repair shops at Moncton, N. B., a large line of electric motors, both for direct and alternating current. Most of the machinery has already been contracted for.

The Rochester Railway & Light Company, Rochester, N. Y., is having plans prepared for a two-story steel and concrete electric automobile repair shop to be erected at Andrew and Front streets. Bids will be called for in a few days covering construction and equipment for the building.

The Weston Mfg. Company, Binghamton, N. Y., has been incorporated to manufacture special machinery, mechanical appliances and devices, with a capital stock of $10,000. Marsh Miller, Frank T. Macey and Oscar W. Alston, Binghamton, are the incorporators.

The Interborough Rapid Transit Company, New York, has secured a permit for the new barn and shops to replace those destroyed by fire last April, on the block bounded by Second and Third avenues and 128th and 129th streets. The building will be 53 x 440 ft., two stories, of brick construction.

Foundries.

The Ruston Foundry & Machine Shops, Ruston, La., has purchased 7 acres of ground in the suburbs of Alexandria, La., where it will erect a new plant. It has purchased the machinery in a local foundry, which it will operate until its new plant can be erected. The foundry which the company operates at Winnfield will also be moved to Alexandria.

Power Plant Equipment.

The Town Board of Okemah, Okla., will receive bids until June 15 for the construction and equipment of a municipal water plant.

The Board of Trustees of Carmen, Okla., will receive bids until June 21 for the construction and equipment of a water works system, including cast iron pipe, hydrants and valves, pumping machinery and boilers.

Having secured a franchise from the City Council, the Lake Preston Milling Company, Lake Preston, S. D., will install a 50-kw. generator, to be run in connection with its flour mill, to furnish light to the city.

The Detroit Iron & Steel Company, Detroit, Mich., has purchased from the Allis-Chalmers Company a Reynolds-Corliss engine and direct current generator of 250 kw.

The Golden States Mines & Iron Works, San Francisco, Cal., will install a new electric generator at its plant.

Additional motors, transformers, &c., are to be installed this summer in the mines and yards of the Berwind-White Coal Mining Company, Windber, Pa.

The Miami County Commissioners, meeting at Peru, Ind., have decided to install an electric light, heat and power plant at the court house and jail, at a cost of $40,000.

Bridges and Buildings.

The Penn Bridge Company, Beaver Falls, Pa., has received a contract for supplying the structural steel for dam No. 26, at Parkersburg, W. Va. The company is operating its plant single turn, but is in position to handle considerable more business than it has at present.

The Modern Steel Construction Company, Waukesha, Wis., has taken a contract for the steel for a 10-story office and store building to be erected in Salt Lake City, Utah.

Ground has been broken for a new building of reinforced concrete construction which is to be added to the plant of the Velie Motor Vehicle Company, Moline, Ill. The contract for the erection of this building has been let to the Leonard Construction Company, Chicago.

The Lackawanna Bridge Company, Buffalo, N. Y., has completed plans for the bridge building plant which it is to erect on the 15-acre site recently purchased on the South Buffalo Railroad, near the Lackawanna Steel Company's works, and will soon commence construction work on the main building, which is to cost $100,000. It is hoped the entire plant will be in readiness to commence operation the fore part of September.

Fires.

The power plant of the Southern Colorado Power Company, Trinidad, Colo., was destroyed by fire June 5, the loss being about $150,000.

The foundry and machine shop of J. S. Getchell & Sons, Presque Isle, Maine, were damaged $20,000 by fire June 7.

Hardware.

The Buffalo Sled Company, manufacturer of children's sleds, steel shovels and hardware specialties, has let contract for an addition to its plant at North Tonawanda, N. Y., 40 x 150 ft., three stories, of concrete block construction.

Miscellaneous.

W. Earl Youker has been appointed receiver for the Brooklyn Forge & Supply Company, Brooklyn, N. Y.

The Ingram-Richardson Mfg. Company, Beaver Falls, Pa., maker of porcelain enameled signs, denies the report that it proposes to engage in the manufacture of pressed steel enameled bathtubs. However, it will probably take up another new line of product in the near future, plans for which are now under way.

The recent note in these columns concerning the American Sterilizer Company, Erie, Pa., was somewhat misleading. The company is erecting a building, 125 x 165 ft., one story, with saw tooth roof.

The American Railway Appliance Company, Oil City, Pa., has decided to build its new plant in Oil City, and in addition to the manufacture of car and track supplies it will build steel tanks.

The Hayes Mfg. Company, Detroit, Mich., has purchased additional land, with buildings, which it is remodeling for the manufacture of metal automobile bodies. The company is also erecting a three-story building, 60 x 160 ft., on the site of its main plant on the Grand Trunk Railroad.

The Waterman-Waterbury Company, Buffalo, N. Y., recently incorporated with a capital stock of $300,000, is closely affiliated with the Waterman-Waterbury Company of Minneapolis, Minn., formerly the Waters Metal Construction Company, and for the present the new company will devote itself entirely to selling in the Eastern territory the Waterman-Waterbury heating and ventilating system manufactured by the Minneapolis company.

The Chattanooga Iron & Wire Works, Chattanooga, Tenn., intends to establish a department for the manufacture of sheet metal work and will later add a foundry. The capital stock will be increased from $10,000 to $25,000 to provide for the improvements. R. C. Lieb, formerly with the Chattanooga Roofing & Foundry Company, has become associated with the company as president and general manager. D. R. Guthrie is vice-president and J. D. Wilkins secretary.

Garrison & Co., the Buffalo branch of the Corrugated Bar Company of St. Louis, Mo., have completed the principal buildings of their new Buffalo plant for the fabricating of corrugated bars and unit frames for concrete reinforcement. The installation of machinery is nearly finished and the company expects to commence active manufacturing operations June 14. The new plant is located on the South Buffalo Railroad, the industrial line of the Lackawanna Steel Company, near that company's works and adjoining the plant of the Seneca Iron & Steel Company. The main building is 160 x 310 ft., with a large wing.

The Newcomb Engine Company has been incorporated at Harrison, N. Y., with a capitalization of $200,000, to manufacture motors, engines, automobiles, &c., by W. B. Thompson, Union Course, N. Y., and O. A. Hack and E. C. Chamberlain, New York.

The Hercules Buggy Company, Evansville, Ind., has purchased the site of the Uhl Pottery Works and will erect a plant for the manufacture of auto buggies and other vehicles, at a cost of $75,000.

The Iron and Metal Trades

Steel Works Furnace Capacity Increased 30,000 Tons Weekly in May.

Harriman Rail Requirements Largely Increased.

The reports sent by the pig iron manufacturers to *The Iron Age* show that some very interesting developments have taken place during May. The active weekly capacity jumped from 412,000 tons per week on May 1 to 442,000 tons on June 1, thus carrying the yearly rate of production to 23,000,000 tons. The increase is due entirely to the blowing in of steel works furnaces, 15 stacks having been started, of which six are owned by the independent companies. In the same time the number of active merchant furnaces decreased by four. Since the steel works production adjusts itself very closely to the requirements of the mills they serve, this increase of over 30,000 tons per week in furnace capacity shows how consumption has expanded.

So far as the merchant furnaces are concerned, an expansion of output is far from desirable, since there are very liberal stocks of pig iron in nearly all the producing districts. From that point of view the returns of the pig iron makers show that developments are along sound lines. Stocks appear to be drawn upon quite generally, so that the industry is getting into better shape. In fact, there is a prospect that at least one independent steel interest may find it necessary to purchase Bessemer iron from merchant furnaces because of inadequate controlled furnace capacity.

After the heavy buying movement in the two past months, transactions in pig iron are on a limited scale. The feeling in the trade is that all that can be expected is that the market will hold steadily at the present level until the next movement sets in.

Shipbuilders have been booking quite a good deal of work lately, with more pending. The Southern Pacific has ordered four boats, which will require a liberal tonnage of plates and shapes, to be furnished by the Carnegie Steel Company. The Maryland Steel Company is to build the three steamers for the American-Hawaiian line.

The railroads continue to appear as more liberal buyers, a fact which is regarded as very encouraging, since they have been the chief laggards. It is understood that the requirements for rails of the Harriman system have now been expanded to 150,000 tons, including requirements for lines in Mexico. During the past week the Missouri Pacific placed 35,000 tons, of which 16,000 tons goes to Pittsburgh, the Chicago & Alton 9000 tons, the Northern Pacific 15,000 tons, the Erie 4000 tons and the Gilmore & Pittsburgh 14,000 tons. For export only small lots have been taken.

As reflecting the growing demand from the railroads it may be noted that the leading forge shops in the Chicago District purchased last week between 12,000 and 15,000 tons of axle billets. Some pretty large car orders are also in the market.

It is not believed that any serious stoppages will follow the declaration of the open shop in the sheet and tin plate mills of the American Sheet & Tin Plate Company.

In the cast iron pipe trade the only really large order in sight is that for about 14,000 tons of pipe and 1700 tons of specials for the New York high pressure service, on which bids are being opened to-day. The industry is suffering from an excessive capacity, and occasionally very low prices keep cropping up.

The old material markets are quieter. In Chicago interest has shifted from melting stock to old car wheels, which have advanced rather sharply under some very good buying.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one week, one month and one year previous.

	June 9, 1909.	June 2, 1909.	May 12, 1909.	June 10, 1908.
PIG IRON, Per Gross Ton:				
Foundry No. 2, standard, Philadelphia	**$16.50**	$16.25	$16.00	$16.50
Foundry No. 2, Southern, Cincinnati	14.50	14.50	14.50	15.25
Foundry No. 2, local, Chicago	16.50	16.50	16.50	17.60
Basic, delivered, Eastern Pa.	**15.50**	15.50	15.00	15.50
Basic, Valley furace	**14.50**	14.25	14.25	15.25
Bessemer, Pittsburgh	15.90	15.90	15.90	16.90
Gray forge, Pittsburgh	**14.65**	14.65	14.40	14.90
Lake Superior charcoal, Chicago	19.50	19.50	19.50	20.00
BILLETS, &c., Per Gross Ton:				
Steel billets, Pittsburgh	23.00	23.00	23.00	25.00
Forging billets, Pittsburgh	25.00	25.00	25.00	27.00
Open hearth billets, Philadelphia	**25.00**	24.50	24.50	26.20
Wire rods, Pittsburgh	**29.00**	29.00	27.00	....
Steel rails, heavy, at mill	28.00	28.00	28.00	28.00
OLD MATERIAL, Per Gross Ton:				
Steel rails, melting, Chicago	**14.75**	14.75	14.00	12.25
Steel rails, melting, Philadelphia	**15.75**	15.50	14.75	13.00
Iron rails, Chicago	**17.00**	17.00	16.50	15.50
Iron rails, Philadelphia	**19.50**	18.50	17.50	18.00
Car wheels, Chicago	**16.00**	15.25	14.75	13.00
Car wheels, Philadelphia	**15.00**	15.00	14.50	14.00
Heavy steel scrap, Pittsburgh	**15.50**	15.75	14.25	13.00
Heavy steel scrap, Chicago	**14.50**	14.50	13.00	11.50
Heavy steel scrap, Philadelphia	**15.75**	15.50	14.75	13.00
FINISHED IRON AND STEEL,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Refined iron bars, Philadelphia	1.40	1.40	1.40	1.40
Common iron bars, Chicago	**1.30**	1.30	1.27½	1.50
Common iron bars, Pittsburgh	1.30	1.30	1.30	1.40
Steel bars, tidewater, New York	1.36	1.36	1.36	1.56
Steel bars, Pittsburgh	1.20	1.20	1.20	1.40
Tank plates, tidewater, New York	*1.41*	1.41	1.46	1.76
Tank plates, Pittsburgh	*1.25*	1.25	1.30	1.60
Beams, tidewater, New York	1.41	1.41	1.41	1.76
Beams, Pittsburgh	1.25	1.25	1.25	1.60
Angles, tidewater, New York	1.41	1.41	1.41	1.76
Angles, Pittsburgh	1.25	1.25	1.25	1.60
Skelp, grooved steel, Pittsburgh	**1.30**	1.30	1.25	1.55
Skelp, sheared steel, Pittsburgh	**1.40**	1.40	1.35	1.65
SHEETS, NAILS AND WIRE,				
Per Pound:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, Pittsburgh	2.20	2.20	2.20	2.50
Wire nails, Pittsburgh	**1.70**	1.70	1.60	1.95
Cut nails, Pittsburgh	**1.65**	1.65	1.60	1.80
Barb wire, galv., Pittsburgh	**2.00**	2.00	1.90	2.50
METALS, Per Pound:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York	**13.75**	13.50	13.25	13.00
Electrolytic copper, New York	**13.62½**	13.25	13.00	12.75
Spelter, New York	**5.50**	5.20	5.10	4.57½
Spelter, St. Louis	**5.35**	5.05	4.92½	4.42½
Lead, New York	**4.40**	4.35	4.30	4.50
Lead, St. Louis	**4.30**	4.25	4.25	4.35
Tin, New York	**29.50**	29.10	29.25	28.25
Antimony, Hallett, New York	7.75	7.75	7.75	8.50
Nickel, New York	45.00	45.00	45.00	45.00
Tin plate, 100 lb., New York	$3.64	$3.64	$3.64	$3.89

Prices of Finished Iron and Steel F.O.B. Pittsburgh.

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Paul, 32c.; St. Louis, 22½c.; New Orleans, 20c.; Birmingham, Ala., 45c. Rates to the Pacific Coast are 80c. on plates, structural steels and sheets, No. 11 and heavier, 85c. on sheets, Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Structural Shapes.—I-beams and channels, 3 to 15 in., inclusive, 1.25c. to 1.30c., net; I-beams over 15 in., 1.35c., net; H-beams over 8 in., 1.45c.; angles, 3 to 6 in., inclusive, ¼ in. and up, 1.30c., net; angles, over 6 in., 1.35c., net; angles, 3 x 3 in. and up, less than ¼ in., 1.45c., base, half extras, steel bar card; tees, 3 in. and up, 1.30c., net; zees, 3 in. and up, 1.30c., net; angles, channels and tees, under 3 in., 1.20c., base, plus 10c. half extras, steel bar card; deck beams and bulb angles, 1.60c., net; hand rail tees, 2.70c., net; checkered and corrugated plates, 2.70c., net.

Plates.—Tank plates, ¾ in. thick, 6¼ in. up to 100 in. wide, 1.25c. to 1.30c., base. Extras over this price are as follows:

Tank, ship and bridge quality, ¼ in. thick on edges, 100 in. wide, down to but not including 6 in. wide, is taken as base.

Steel plates up to 72 in. wide, inclusive, ordered 10.2 lb. per square foot, shall be considered ¼-in. plate. Steel plates over 72 in. wide must be ordered ¼-in. thick on edge, or not less than 11 lb. per square foot, to take base price. Steel plates over 72 in. wide ordered less than 11 lb. per square foot down to the weight of 3-16-in. shall take the place of 3-16-in.

Percentages as to overweight on plates, whether ordered to gauge or weight, to be governed by the Association of American Steel Manufacturers' Standard Specifications.

Gauges under ¼-in. to and including 3-16-in. plates on thin edges	$0.10
Gauges under 3-16-in. to and including No. 8	.15
Gauges under No. 8 to and including No. 9	.25
All sketches (excepting straight taper plates varying not more than 4 in. in width at ends, narrowest end being not less than 30 in.)	.10
Complete circles	.20
Boiler and flange steel plates	.10
"A. B. M. A." and ordinary firebox steel plates	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Shell grade of steel is abandoned.	
For widths over 100 in. up to 110 in	.05
For widths over 110 in. up to 115 in	.10
For widths over 115 in. up to 120 in	.15
For widths over 120 in. up to 125 in	.25
For widths over 125 in. up to 130 in	.50
For widths over 130 in	1.00

TERMS.—Net cash 30 days. Pacific Coast base, 1.30c. f.o.b. Pittsburgh.

Sheets.—Minimum prices for mill shipments on sheets in carload and larger lots, on which jobbers charge the usual advances for small lots from store, are as follows: Blue annealed sheets, No. 10 and heavier, 1.65c.; Nos. 11 and 12, 1.70c.; Nos. 13 and 14, 1.75c.; Nos. 15 and 16, 2.05c.; box annealed sheets, Nos. 17 to 21, 2c.; Nos. 22 to 24, 2.05c.; Nos. 25 and 26, 2.10c.; No. 27, 2.15c.; No. 28, 2.20c.; No. 29, 2.25c.; No. 30, 2.35c. Galvanized sheets, Nos. 13 and 14, 2.25c.; Nos. 15 and 16, 2.35c.; Nos. 17 to 21, 2.50c.; Nos. 22 to 24, 2.65c.; Nos. 25 and 26, 2.85c.; No. 27, 3.05c.; No. 28, 3.25c.; No. 29, 3.25c.; No. 30, 3.60c. Painted roofing sheets, No. 28, 1.55c. per square. Galvanized roofing sheets, No. 28, 2.80c. per square for 2½-in. corrugations.

Wrought Pipe.—Discounts on steel pipe, ¾ to 6 in., in carloads to the largest trade, are 81 and 5 per cent. off list, and on iron pipe, 4½ to 8 in., are 78 and 5 per cent. off list.

Boiler Tubes.—Regular discounts are as follows:

Boiler Tubes.

	Steel.
1 to 1½ in.	50
1¾ to 2¼ in.	62
2¾ to 5 in.	70
2½ in.	64
6 to 13 in.	62

2½ in. and smaller, over 18 ft. long, 10 per cent. net extra.
2¾ in. and larger, over 22 ft. long, 10 per cent. net extra.

Wire Rods.—Bessemer rods, $29; chain rods, $29; basic rods, $29 to $30.

Chicago.

FISHER BUILDING, June 9, 1909.—(*By Telegraph.*)

New rail purchases by Western roads within the past week have added 59,000 tons to the recent heavy orders taken by the Illinois Steel Company, and a considerably larger tonnage will likely be formally placed within a few days by the Harriman lines. Inquiries are also out for traction rails for two Michigan electric lines. The growing activity of railroad demand is making itself felt in other directions as well. Between 12,000 and 15,000 tons of car axle billets were taken last week by the leading forge shops, and a heavy buying movement in old car wheels, started by the efforts of leading consumers to secure round lots, has advanced prices 75c. to $1 a ton. Deliveries are beginning to fall behind in some lines, particularly in plates and shapes. The South Works structural mill of the Illinois Steel Company is supplied with specifications to fill its rolling schedules until August, and the business on its books is in excess of its capacity for the remainder of the year. It is likely that some of these orders will be transferred to the Carnegie mills at Pittsburgh. All of the finishing mills of the Illinois Steel Company at Bay View, Joliet and South Works are going practically full. There is some falling off in new buying, as compared with the heavy tonnages brought out by the extremely low prices in effect a few weeks ago, but the outlook for the uninterrupted operation of mills through the rest of the year is most encouraging.

Pig Iron.—Some widening of demand was evident in the greater number of sales entered last week by the various selling agencies. Transactions were chiefly limited to the requirements of smaller melters, which included lots ranging from 200 to 500 tons for third quarter delivery. The heaviest end of the tonnage went to the Northern furnaces, owing to the rather indifferent attitude of the leading Southern producers respecting deliveries for fourth quarter and beyond. With perhaps but one exception, the principal Alabama furnaces are asking $12, Birmingham, for fourth quarter iron, and one prominent interest in that district has practically withdrawn from the market on third quarter business. Under these conditions Northern iron is firmer and $16 furnace is more nearly representative of the actual as well as nominal price than for some time. There are a few inquiries out from the large consumers of foundry iron, one being for 5000 tons and another for 4000 tons. The latter is for malleable Bessemer required by a Milwaukee concern, which took a like tonnage a short time ago. The sale of 500 tons of charcoal iron of special grade is reported. About the only holdup orders against contract shipments received are coming from the railroad malleable foundries, which are, as a rule, still running light. If the iron purchased for second quarter delivery is taken in according to schedule through this period, a possible retarding influence will have been removed from the path of progress. The following prices are for June delivery, f.o.b. Chicago:

Lake Superior charcoal	$19.50 to $20.00
Northern coke foundry, No. 1	17.00 to 17.50
Northern coke foundry, No. 2	16.50 to 17.00
Northern coke foundry, No. 3	16.00 to 16.50
Northern Scotch, No. 1	17.50 to 18.00
Southern coke, No. 1	16.35 to 16.85
Southern coke, No. 2	15.85 to 16.35
Southern coke, No. 3	15.35 to 15.85
Southern coke, No. 4	14.85 to 15.35
Southern coke, No. 1 soft	16.35 to 16.85
Southern coke, No. 2 soft	15.85 to 16.35
Southern gray forge	14.35 to 14.85
Southern mottled	14.10 to 14.60
Malleable Bessemer	16.50 to 17.00
Standard Bessemer	17.40 to 17.90
Jackson Co. and Kentucky silvery, 6 %	19.90 to 20.40
Jackson Co. and Kentucky silvery, 8 %	20.90 to 21.40
Jackson Co. and Kentucky silvery, 10 %	21.90 to 22.40

(*By Mail.*)

Billets and Rods.—Practically all makers of billets have orders for finished material sufficient to absorb their output of steel and are therefore not pressing for business in semifinished steel. On some inquiries for forging billets now in the market $26 has been quoted, but the Eastern mills are not meeting this price, which, it is believed, is not susceptible of any shading. Some round lots of axle billets have been purchased by local forge shops. Wire rods are firm at current quotations, with but little new business being offered. Specifications against such contracts as are outstanding are being freely supplied.

Rails and Track Supplies.—New rail orders entered last week by the Illinois Steel Company included 9000 tons for the Chicago & Alton and 35,000 tons from the Missouri Pacific. Of the latter, 16,000 tons will be rolled by the Carnegie Steel Company. The Illinois Steel Company also secured the 15,000 tons from the Northern Pacific, noted as pending in last report; one-half of this tonnage is open hearth and will be rolled at Gary. The tonnage heretofore reported as under negotiation by the Harriman lines has been increased to upward of 150,000 tons, and though not as yet formally closed, a large part will likely go to the mills of the leading interest. It is interesting to note that the delivery of not less than 18,000 tons per month for the rest of the year will be required on this order, a portion of which is destined for lines in Mexico now under construction. The rails for domestic use are to be 85-lb. sections and those for foreign shipment 75-lb. sections. Light rail orders are coming out at a better rate, one order of 3000 tons having been secured last week by the Illinois Steel Company, whose light rail business for May amounted to 6000 tons. The demand for track supplies has been greatly stimulated by the recent heavy purchases of new rails, for which a large amount of fastenings are required. There is no lack of specifications, the Joliet mills being already behind with deliveries on bolts. So far as the South Works is concerned, the question of delivery on rails is becoming a factor in figuring on business offered. An order of 2000 tons offered by a Michigan road was declined because of inability to execute as promptly as required. No. 2 mill at these works, which has not been running full since 1907, is being keyed up to full capacity, with enough business in hand to keep it going for several months to come. Light rail prices are reported as practically firm at the following quotations: 40 to 45 lb. sections, $26; 30 to 35 lb. sections, $26.75; 16, 20 and 25 lb. sections, $27; 12-lb. sections, $28, Chicago, less 50c. a ton on lots under 500 tons and $1 a ton on lots over 500 tons.

Structural Material.—While no fabricating orders of exceptional size were included in last week's transactions, the aggregate of small orders taken represented a fair tonnage, the larger portion of which was supplied by the railroads. Among the latter were 2110 tons placed by the Chicago, Milwaukee & St. Paul, about two-thirds of which was taken by the American Bridge Company, the remainder going to the Toledo-Massillon Bridge Company. Another order of 1000 tons was placed by the same road with the Wisconsin Bridge & Iron Company. The King Bridge Company secured 2000 tons from the Missouri, Kansas & Texas Railroad, and 500 tons was let by the Monon Road to the Strobel Steel Construction Company. The Des Moines Bridge and Iron Works was the successful bidder on 300 tons required for a power house to be erected by the Des Moines Electric Company, and the Halpin Building, Kansas City, 216 tons, was awarded to the Kansas City Structural Steel Company. Among the local contracts let were 1200 tons for the Chamberlain Building, taken by Geo. W. Jackson, Inc.; the Schindler Theater, 135 tons, and a factory

building for the Monarch Brewery, 160 tons, both going to the Modern Steel Structural Company, and 115 tons for a five-story warehouse, to be fabricated by the Wisconsin Bridge & Iron Company. Bids will be asked soon on 4500 tons to be used in the construction of a new office building at Detroit. Bridge contracts still pending, aggregating about 26,000 tons, include the Winner bridge, at Kansas City; the Oregon Short Line bridge over the Willamette River, and a highway bridge over the Columbia River, at Portland. The demand for delivery of railroad material is becomming more urgent, and the mills are nearly all supplied with specifications for full rolling schedules. Prices of plain material are firm, at 1.45c. to 1.48c., Chicago.

Plates.—Business of considerable volume is coming to the mills in current orders. If the mills were inclined to load up with contracts for future delivery at present prices they could doubtless secure a much heavier tonnage; but sales are being restricted to orders with specifications, except in some cases where time is required for the execution of specific work. Even with some important sources of supply, such as car and boiler shops, still comparatively inactive, the local mills are operating at full capacity. We quote for plates ¼ in. and heavier 1.45c. to 1.48c., Chicago.

Sheets.—The demand for sheets is slowly improving. Jobbers are buying more liberally than for some time to fill up depleted stocks. A few mills are still anxious enough for business to offer slight concessions from regular prices, but some makers are pretty comfortably fixed for orders and are therefore less aggressive. On the whole, however, the situation both as respects prices and demand is slowly improving. After a shutdown of nearly three months the Atlanta Sheet & Tin Plate Company, Atlanta, Ind., resumed operations on June 1, with orders enough to keep it busily engaged for several months.

Bars.—As compared with the business done in May, there has been considerable let up in new buying of steel bars; yet the leading mills are still booking a fair amount of business. Specifications from the implement makers are unusually heavy, considering the fact that the inventory season of these interests is now near at hand and no more material than is actually required is ordinarily taken in prior to July 1. Some of the orders against contracts now being received are for shipment after that date. There is very little, if any, improvement in the demand for bar iron, which is mainly confined to scattered orders for immediate use. The mills, in fact, are unwilling to contract ahead for more than 30 or 60 days at the low prices now ruling. We quote steel bars at 1.35c. to 1.38c., Chicago; iron bars at 1.30c., Chicago, the latter not yet being absolutely firm at this figure.

Merchant Pipe.—Jobbers still continue to buy for current requirements, the gradual growth of demand observed being due almost wholly to increased consumption. Jobbers are not enlarging their stocks in anticipation of future requirements, but each successive week brings out a little more business. Prompt shipments are yet available, but the mills are running closer to full capacity than they have been for many months. Regular prices are reported to be evenly maintained.

Boiler Tubes.—Small orders for merchant tubes, which constitute the bulk of the business moving, are being supplied mainly from jobbers' stocks, with here and there a few car lot orders for mill shipment. Neither merchant nor boiler tubes are keeping step with the accelerated movement observed in other mill products.

Merchant Steel.—With contracts for the coming season practically all placed, interest now centers in specifications. The implement makers have nearly all wound up their work for the present season and are getting ready for July inventories. Some specifications are being received for shipment after July 1, but the movement is by no means general. For the next few weeks there is not likely to be much doing, but the liberal contract orders booked indicate a resumption of activities in July or August.

Cast Iron Pipe.—The only municipal letting reported is one of a few hundred tons to be awarded early this week by East Grand Forks, S. D. Most of the larger cities have already contracted for the season's requirements. There is a good run of car lot orders, however, from various sources. We quote per net ton, Chicago, as follows: Water pipe, 4 in., $27.50; 6 to 12 in., $26.50; 16 in. and up, $25.50, with $1 extra for gas pipe.

Old Material.—Market interest has shifted from melting steel to old car wheels. Sales of the latter aggregating several thousand tons, at prices ranging from $15.50 on transactions last week up to $16.75 per gross ton on one of 4000 tons this week, are reported. During the period of low prices a large tonnage of old car wheels was accumulated by dealers who have been holding them for an advance that would net a round profit. At $16, or better, most of these holdings would realize handsome returns on the original investment, and the appearance of such a price very naturally brought out heavy offerings. If the tonnage in reserve is anything like as heavy as is currently estimated, the demand will be quickly satisfied at the present market. Consumers of melting steel and mill scrap, being generally well supplied, are refusing to buy at the prices now asked by dealers. Orders for small lots of cast scrap from the less important foundries are plentiful. The market continues firm, but its future course will depend upon which yields first, the dealer or consumer. Railroads lists offered for closure this week include 3000 tons from the Chicago, Milwaukee & St. Paul and 6000 tons from the Baltimore & Ohio. The following prices are per gross ton, f.o.b. Chicago:

Old iron rails	$17.00 to $17.50
Old steel rails, rerolling	15.50 to 16.00
Old steel rails, less than 3 ft	14.75 to 15.25
Relaying rails, standard sections, subject to inspection	22.50 to 23.50
Old car wheels	16.00 to 16.50
Heavy melting steel scrap	14.50 to 15.00
Frogs, switches and guards, cut apart	14.50 to 15.00
Mixed steel	11.50 to 12.00

The following quotations are per net ton:

Iron fish plates	$17.00 to $17.50
Iron car axles	18.75 to 19.25
Steel car axles	17.75 to 18.25
No. 1 railroad wrought	13.50 to 14.00
No. 2 railroad wrought	12.50 to 13.00
Springs, knuckles and couplers	13.50 to 14.00
Locomotive tires, smooth	14.50 to 15.00
No. 1 dealers' forge	11.00 to 11.50
Mixed busheling	8.00 to 8.50
Steel axle turnings	9.50 to 10.00
Machine shop turnings	7.50 to 7.75
Cast borings	6.00 to 6.50
Mixed borings, &c	5.75 to 6.25
No. 1 mill	7.00 to 7.50
No. 2 mill	6.00 to 6.50
No. 1 boilers, cut to sheets and rings	10.50 to 11.00
No. 1 cast scrap	14.00 to 14.50
Stove plate and light cast scrap	11.75 to 12.25
Railroad malleable	13.00 to 13.50
Agricultural malleable	11.00 to 11.50
Pipes and flues	10.25 to 10.75

Metals.—The general demand for copper is better, and some good orders, including carload lots, have been entered during the week. The most active consuming interests in the market are the railroad brass foundries, plumbing goods factories and makers of automobile parts; the latter have become quite an important factor in the consumption of copper. Spelter is moving fairly well, with an upward tendency in price. Dealers report a better movement in old metals, and an advance of about ¼c. on copper grades. Quotations are as follows: Casting copper, 13½c.; lake, 14c. to 14¼c., in car lots, for prompt shipment; small lots, ¼c. to ⅜c. higher; pig tin, car lots, 31c.; small lots, 33c.; lead, desilverized, 4.50c. to 4.60c., for 50-ton lots; corroding, 4.75c. to 4.85c., for 50-ton lots; in car lots, 2¼c. per 100 lb. higher; spelter, 5.35c. to 5.45c.; Cookson's antimony, 10½c., and other grades, 9¾c. to 10¼c.; sheet zinc is $6.75, f.o.b. La Salle, in car lots of 600-lb. casks. On old metals we quote: Copper wire, crucible shapes, 13¼c.; copper bottoms, 11¾c.; copper clips, 12½c.; red brass, 12c.; yellow brass, 9½c.; light brass, 7c.; lead pipe, 4¼c.; zinc, 4.75c.; pewter, No. 1, 23c.; tin foil, 23c.; block tin pipe, 26c.

Birmingham.

BIRMINGHAM, ALA., June 7, 1909.

Pig Iron.—The business transacted in this market in the past week was probably of smaller volume than for the week previous, but a higher average price was received, and the lines of trade represented in the transactions are indicative of further improvement in general conditions. Considerably more interest is shown by prospective purchasers in advanced deliveries, and a portion of recent engagements is for shipment covering the remainder of the year. Requirements of leading pipe manufacturers are yet to be provided for, and a material increase in the consumption of such foundries is indicated. On No. 2 foundry $11.50, Birmingham, is still considered the market price for last half deliveries, but such quantities of gray forge as are found on furnace yards are sold at 25c. to 50c. per ton higher than a $11.50 basis for No. 2, cases being reported also where the demand could not be supplied at the premium price. Producers are not disposed to sell gray forge for advanced deliveries, while No. 4 foundry is offered only moderately on to-day's basis. For prompt delivery, it is probable that Nos. 2 and 3 foundry could be had at $11.25, or even $11 per ton, but such figures are believed to be available only under special conditions. For strictly last quarter deliveries $12 is being adhered to by the majority of producers, while two are asking that price for the third quarter. A sale is reported of 1000 tons of No. 2 for third quarter shipment at $11.50 per ton. A lot of 750 tons of Nos. 2 and 3 foundry for August and September delivery brought $11.50, as did a number of smaller lots.

Cast Iron Pipe.—The principal order recently secured by a Southern plant covers 1000 tons of water pipe for Gaffney, S. C. The buying by interests in the market from time to time for comparatively small lots has resulted in an aggregate quite equal to expectations, notwithstanding the absence of large contracts. A local interest reports its output for the next three months disposed of, and it is understood that the plant soon to be put in operation has

sufficient orders booked to warrant a normal rate of production. A contract for 2500 tons of water pipe for Carthage, Miss., is soon to be awarded, and is the only Southern order of consequence in sight at this time. We quote water pipe as follows, per net ton, f.o.b. cars here: 4 in. to 6 in., $25; 8 in. to 12 in., $24; over 12 in., an average of $23, with $1 per ton extra for gas pipe. These quotations are shaded on large municipal contracts.

Old Material.—A demand for light cast is noticeable, without materially affecting asking prices as last revised. Sentiment as to steel scrap has improved only so far as dealers are concerned, although inquiry is somewhat more encouraging. Further additions to dealers' stocks have been made, and quotations are generally firmer. We quote dealers' asking prices as follows, per gross ton, f.o.b. cars here:

Old iron rails	$13.50 to $14.00
Old iron axles	14.50 to 15.00
Old steel axles	12.00 to 12.50
No. 1 railroad wrought	12.00 to 12.50
No. 2 railroad wrought	10.00 to 10.50
No. 1 country wrought	9.00 to 9.50
No 2 country wrought	8.50 to 9.00
No. 1 machinery	10.50 to 11.00
Tram car wheels	10.50 to 11.00
Standard car wheels	12.00 to 12.50
Stove plate and light cast	8.50 to 9.00
Cast borings	4.00 to 4.50

Philadelphia.

PHILADELPHIA, PA., June 8, 1909.

The heavy buying movement recently noted in the pig iron market has subsided. A fair aggregate of small lots has been booked, however, and prices are comparatively strong. Finished materials continue to be taken in moderate quantities, although mills in this territory do not show any pronounced gain in production, except in structural shapes, producers of which are running their mills at full capacity. There is, however, a decidedly better feeling in the trade generally. In some instances the business taken so far this month shows an increase over that for the same period last month, and it is believed that the moderate gains made will continue, and that after the tariff matter has been disposed of and the usual crop uncertainty is out of the way there will be a steady improvement until normal conditions are once more reached.

Pig Iron.—The market has been rather quiet, but maintains its strength. In fact, there has been less disposition to sell foundry grades at the recent low figures, and standard brands are now practically on a firm basis at $16.50, for prompt No. 2 X, delivered in this territory; and while some will accept this figure for third quarter shipment, others ask $16.75 for such delivery. It may still be possible to do $16.25 for prompt iron of that grade, but it is in exceptional cases, where efforts are being made to introduce the brand or the iron is slightly off the grade. The tonnage available for prompt shipment is limited, however, as the majority of producers in this territory are pretty well sold up for the next two or three months. The bulk of the recent sales in the foundry grades have been in small lots, ranging from carloads to a few hundred tons for prompt and third quarter delivery. One sale of 950 tons of mixed brands to the Baltimore & Ohio Railroad at full prices, for comparatively early delivery, is reported. The cast iron pipe interests are still in the market for low grade iron, and several sales of 1000-ton lots, as well as several smaller tonnages, have been taken for early delivery by interests in this district. These grades are scarce, however, and are held at higher figures, $15.25, delivered, being realized in a number of instances. Virginia foundry irons have been in somewhat better demand. The majority of the sales have been in moderate tonnages for delivery during the next three months, although one transaction covering 2000 tons of No. 2 X, for delivery during the next four months, was closed at $13.75, furnace. Delivery, however, was not strictly within this territory. Southern foundry has been a trifle more active. Small sales on the $11.50, Birmingham basis, for No. 2 are reported, while several moderate lots of low grade iron have been sold. Prices for third quarter are firm, but some weakness is reported in spot irons. Forge iron is rather dull; makers have marked prices up 25c. a ton, but little business has been transacted. The steel making irons have been rather inactive. One sale of a round lot of basic for early delivery is reported for third quarter shipment at $15.50, delivered. The majority of the melters of this grade are now pretty well covered for the near future and have withdrawn from the market. Low phosphorus has been in light demand, one transaction of 500 tons being reported at the full market price. The situation on the whole is strong, notwithstanding the decreased volume of business, and sellers in this territory, being as a rule pretty well sold up, are not forcing business. There has been some inquiry for iron for next year's delivery, but producers are not inclined to quote for such deliveries. For third and fourth quarter shipment some sellers ask an advance of 25 and 50c., respectively, dependent on the brand and tonnage. For prompt shipment, however, the following range of prices are quoted for standard brands, delivered in buyers' yards, eastern Pennsylvania and nearby territory:

Eastern Pennsylvania, No. 2 X foundry	$16.50 to $16.75
Eastern Pennsylvania, No. 2 plain	16.00 to 16.25
Virginia, No. 2 X foundry	16.50 to 16.75
Virginia, No. 2 plain	16.25 to 16.50
Gray forge	15.25
Basic	15.50
Low phosphorus	19.50 to 20.00

Ferromanganese.—A moderate demand, both for deliveries during the last half of the year and the first half of 1910, is noted. The amounts asked for are not very large and no important transactions have been closed. For last half delivery $41 to $42, Baltimore, is named, with about a dollar advance for the first half of next year.

Billets.—There has been a little better inquiry and prices show a hardening tendency. Sales of lots of a few hundred tons each for early delivery have been made at a slight advance, and ordinarily rolling steel is now held by Eastern mills at $25, delivered in this territory; for extended delivery an dvance of a dollar or more a ton is asked. Forging billets have been in moderate demand at the usual advance of $2 a ton, the usual extras applying for high carbons and special sizes.

Plates.—A fairly active demand for boiler steel, as well as bridge and railroad material, is reported. Specifications are somewhat heavier and Eastern mills have gained slightly in the tonnage of business taken. Considerable business is in sight for bridge, boat and structural work and the outlook is considered somewhat more encouraging. Quotations are firmly maintained at 1.45c. to 1.55c. for ordinary plates delivered in this territory, the usual extras applying.

Structural Material.—A fairly active market is reported, although requirements are mostly in small and moderate tonnages. Mills in this territory are pretty fully engaged; the Pencoyd plant of the American Bridge Company is running full time, as is also the structural department of the Bethlehem Steel Company. There has been some hardening in the price of fabricated work, while plain material quotations are firmly maintained at 1.45c. to 1.55c., according to the specifications, for delivery in this territory.

Sheets.—Makers have stiffened up again, and it is harder to obtain concessions. The demand shows but little change; there is a good day to day business, and mills in this territory continue to operate close to normal capacity. Yet the business taken is mainly for prompt shipment, as sellers refuse to accept contracts for extended delivery at the present level of prices, which range as follows for delivery in this territory: Nos. 18 to 20, 2.40c.; Nos. 22 to 24, 2.50c.; Nos. 25 and 26, 2.60c.; No. 27, 2.70c.; No. 28, 2.80c.

Bars.—While no large orders of iron bars have been placed, the market is decidedly stronger, and prices, while not actually higher, are firmer. Several sellers now hold steel bars at 1.40c., delivered in this territory, an advance of $1 a ton, but we understand that 1.35c. can still be done for fairly prompt shipment. Refined iron bars are quoted at 1.40c. to 1.50c., mills having a wide range of sizes holding prices somewhat higher than those making only a narrow range. Several of the Eastern mills have, we understand, formed a consolidation with several chain and spike makers under the name of the Iron & Steel Products Company and will manufacture bars, bolts, spikes, chains and other semifinished products. Details, however, are not yet available.

Old Material.—The market continues strong, and prices show a slight advancing tendency. Several round lots of heavy melting steel have been sold, nearly all to one purchaser, at $15.75, delivered, and $16 could, no doubt, be obtained for tonnage. Sellers, however, are not disposed to let large lots go on the advancing market, so that what business has been done has been confined to small lots. Railroad lists now out represent about the average tonnage and are being quite extensively figured on. Choice railroad wrought iron shows a little weakness, the majority of the other leading grades maintain their full strength and in instances show a further advance. For delivery in buyers' yards, eastern Pennsylvania and nearby territory, quotations, while still normal to some extent, range about as follows:

No. 1 steel scrap and crops	$15.75 to $16.25
Low phosphorus	19.50 to 20.50
Old steel axles	20.50 to 21.50
Old iron axles	22.00 to 23.00
Old iron rails	19.50 to 20.50
Old car wheels	15.00 to 15.50
Choice No. 1 R. R. wrought	18.25 to 18.75
Machinery cast	15.00 to 15.50
Railroad malleable	14.00 to 14.50
Wrought iron pipe	15.50 to 16.00
No. 1 forge fire scrap	13.00 to 13.50
No 2 light iron	9.00 to 9.50
Wrought turnings	12.50 to 13.00
Stove plate	12.00 to 13.00
Cast borings	10.50 to 11.00
Grate bars	13.50 to 14.00

Coke.—The demand for furnace coke is less active, requirements for the last half of the year being pretty generally covered. Moderate volume of business has been done in foundry coke at unchanged prices. Quotations are some-

what firmer, the following range being named for delivery in this territory:

Connellsville furnace coke	$3.90 to $4.10
Foundry coke	4.35 to 4.50
Mountain furnace coke	3.50 to 3.70
Foundry coke	3.80 to 4.10

Cincinnati.

CINCINNATI, OHIO, June 9, 1909.—(*By Telegraph.*),

On the whole, all iron and steel markets show an improvement over last week, particularly pig iron and bars. The final adoption of the new building code will stimulate building projects in Cincinnati. Reports from outlying districts show that foundries are a little busier, and iron is being taken in better volume on contracts. Mills in this district are all active, some running to full capacity, and others adding men and hours gradually. The week has started well with the larger tool builders, upright drills and milling machines coming in for the major share of attention.

Pig Iron.—While the quoted prices show no material change, there is a firmness about the market which, if it can be maintained the balance of the month, will do much to sustain third quarter asking prices. It appears that $11 iron has finally been eliminated, and the Southern interests which have lately sold limited tonnage at that figure now steadfastly refuse business at anything less than $11.50 for standard foundry iron for prompt and third quarter delivery. Ruling prices in this market for standard Southern brands are to-day $11.50 for June and third quarter and $12 for last quarter. On Northern iron, which is a trifle weaker than last week, $14.50 is the usual minimum for any delivery, although disturbing rumors of $14 business from a furnace interest outside the Ironton District has somewhat unsettled this market. At a late hour this afternoon a Southern producer wired its agents here an advance to $12 for any delivery in the balance of the year. Forge irons are again in some demand and the price has advanced from $10.25, nominally, to $10.50 and $10.75, Birmingham, for early delivery. A modest tonnage of resale iron of a Southern standard brand offered at $11, Birmingham, for No. 2, under special conditions, started rumors that will hardly have any depressing effect on the market. Malleable is in demand, and there is also some inquiry for basic from the steel makers, who are disgusted with the rapid advance of melting steel. A sale of 1000 tons of malleable Bessemer in northern Indiana territory was made by an Ohio furnace which has a little advantage in freight rates over the Ironton District. Another sale of malleable is noted at $14.50, Ironton. A Michigan stove manufacturer is buying 300 tons, and stove companies are feeling the market for August purchases. Inquiries are accumulating also from rolling mills for low grades for their mixtures. An inquiry from a Central States interest calls for 500 tons each of Northern and Southern No. 2 foundry. Pittsburgh interests are inquiring for a quantity of Southern foundry iron. The largest inquiry in this market to-day is for 4600 tons of foundry iron for the last half, from a Chicago manufacturer of miscellaneous castings. Another is from an Ohio concern for 1500 tons of foundry iron and 2000 tons of forge, for delivery in the next two or three months. A Dayton, Ohio, melter is asking for prices on 500 to 1000 tons of No. 2 Northern foundry, delivery through the last half. A northern Ohio melter asks for prices on 200 tons of Northern and 100 tons of Southern. A northern Indiana melter wants from 1500 to 2000 tons of gray forge. Some chilling grades of charcoal iron have been sold in Louisville territory on the basis of $19.50, Birmingham. Northern coke irons are quoted at $15.50 to $16. High silicon irons are still on the basis of $18.50 for 8 per cent. Red River Furnace in the Tennessee District is expected to blow in the next few days. Williamson, at Birmingham, which is relining, will be blown in about September 1. One of the two alternate Oxmoor stacks, at Oxmoor, Ala., will blow in soon. For early delivery, based on a freight rate of $3.25 from Birmingham and of $1.20 from the Ironton District, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 foundry	$15.00 to $15.50
Southern coke, No. 2 foundry	14.50 to 15.00
Southern coke, No. 3 foundry	14.00 to 14.50
Southern coke, No. 4 foundry	13.75 to 14.00
Southern coke, No. 1 soft	15.00 to 15.50
Southern coke, No. 2 soft	14.50 to 15.00
Southern coke, gray forge	13.50 to 13.75
Ohio silvery, 8 per cent. silicon	19.70
Lake Superior coke, No. 1	16.20 to 16.70
Lake Superior coke, No. 2	15.70 to 16.20
Lake Superior coke, No. 3	15.20 to 15.70
Standard Southern car wheel	22.25 to 23.25
Lake Superior car wheel	21.75 to 22.75

(*By Mail.*)

Coke.—The market in both furnace and foundry coke is stronger and some contracting is in progress, particularly for foundry grades. For Connellsville furnace brands $1.75 can be done on spot business, and on contract $2; for foundry grades $2 spot, and $2.25 to $2.50 on forward business. Wise County furnace coke is selling at $1.75 to $1.90, with little or no spot demand; foundry $2 to $2.50, covering any delivery. No change is noted in Pocahontas; prices are about $1.75 for furnace and $2 to $2.25 for foundry.

Structural Material.—Sales agencies here have assumed an independent attitude on structural shapes, and the minimum on the general run of orders is 1.35c., Pittsburgh, with one large interest asking 1.40c., and no forward contracting is being done by any. One large interest reports enough business booked to engage its best efforts to the close of September, and solicitation in the way that has been seen for several months has ceased. The largest local business in sight is the new Walnut Hills Theatre, to be built on McMillan street, which will take something like 600 tons.

Bars and Sheets.—Current orders are being booked at 1.25c., Pittsburgh, on steel bars, and this price seems to be general. All interests indicate unwillingness to book forward business, except at a very substantial advance. Automobile builders were heavy buyers of steel bars last month. The sheet business shows up well, with some good sales of black and galvanized sheets on which recent quotations, Pittsburgh base, are unchanged, although there is said to be some shading still. The Newport Rolling Mill Company was operating nine mills on Monday, and will have the full 10 in to-day, Tuesday.

Old Material.—All lines of scrap are strong, save melting steel, and particularly No. 1 cast scrap, in which there has been large contracting during the week. Some dealers are asking $14, but $13.50 can be done. All dealers are impressed with the prospects for a strong business in the second half and are preparing accordingly. Aside from cast scrap prices have not been advanced materially since our last report, and we quote dealers' asking prices, f.o.b. cars Cincinnati, as follows:

No. 1 R. R. wrought, net ton	$14.50 to $15.00
Cast borings, net ton	6.75 to 7.25
Heavy melting steel scrap, gross ton	13.50 to 14.50
Steel turnings, net ton	9.00 to 9.50
No. 1 cast scrap, net ton	13.50 to 14.00
Burnt scrap, net ton	9.50 to 10.50
Old iron axles, net ton	17.50 to 18.00
Old iron rails, gross ton	15.00 to 15.50
Old steel rails, short, gross ton	13.50 to 14.00
Old steel rails, long, gross ton	13.50 to 14.00
Relaying rails, 56 lb. and up, gross ton	21.50 to 22.00
Old car wheels, gross ton	14.50 to 15.00
Low phosphorus scrap, gross ton	14.00 to 14.50

Pittsburgh.

PARK BUILDING, June 9, 1909.—(*By Telegraph.*)

Pig Iron.—There is distinct improvement in the local pig iron market, demand being more active than for some time, while prices are steadily hardening and are slightly higher. A large steel interest that is also a producer of pig iron and which bought heavily of Bessemer recently, is reported to be again in the market for a round tonnage, and a local consumer closed on Monday and Tuesday for 12,000 to 14,000 tons of standard basic, part for shipment in the third quarter and part for delivery over the last half of the year at prices running a trifle under $14.50, at Valley furnace. However, it would be impossible to duplicate this purchase to-day, as the market is higher. Prices are very firm, and we quote standard Bessemer iron at $15 to $15.25; malleable Bessemer, $14.75; basic, $14.75, for delivery over the last half; No. 2 foundry, $14.75 to $15, and gray forge, $13.75 to $13.90, all at Valley furnace, the freight rate to Pittsburgh being 90c. a ton. A sale is reported of 500 tons of standard Bessemer at about $15.25, Valley furnace.

Steel.—The American Sheet & Tin Plate Company is now specifying for sheet and tin bars at the rate of 24,000 tons a week, or about 110,000 tons a month, and in addition is a producer of sheet and tin bars to the extent of about 25,000 tons a month. Two leading interests that make sheet and tin bars are reported to be sold up and out of the market for delivery in the next three or four months. Specifications against contracts from other consumers for billets, sheets and tin bars are coming in freely and the whole steel market is quite active and prices are firm. We quote Bessemer and open hearth billets at $23, forging billets at about $25, and sheet and tin bars at $24 to $25, Pittsburgh.

(*By Mail.*)

Present active conditions in the steel trade give every promise of continuing during this month at least and possibly through July, but the general expectation is there will be a recession in the hot months, with gradual improvement in the fall and that by the close of the year manufacturing plants of all kinds will be in full swing again. A feature of the market is that jobbers are very desirous of taking in material in large quantities for shipment over the next three or four months, but the mills do not seem anxious to load up with more tonnage for delivery very far ahead, believing that after the hot months are over prices are bound to show further betterment. May was a record-breaker in output of iron and steel of all kinds, and June promises to be fully as heavy and may possibly exceed last month. One reason for this is that the wage scales of the iron and steel bar mills and the sheet and tin plate mills expire on June 30 and there may be some trouble between the Amalgamated Association and the companies that sign the scales. This is particularly true of the sheet and tin plate scales, in view of

the announcement made last week by the American Sheet & Tin Plate Company that after June 30 it would operate all its sheet and tin plate mills on an "open shop" basis. This action was a complete surprise to the Amalgamated Association officials and a meeting of its Advisory Board is being held in this city to-day (Tuesday) to consider the situation. The outlook now is that there will be very little opposition on the part of the men and that at most of the plants affected the men will continue at work without having the scales signed. What will be done with the independent sheet and tin plate mills is a matter of conjecture, but one leading independent sheet and tin plate mill has announced that it will sign the scale of wages posted last week by the American Sheet & Tin Plate Company, with the provision that the scales can be terminated on 30 days' notice from either side. Whether the Amalgamated Association will agree to this remains to be seen, but the chances are it would strongly oppose such an arrangement. The Western bar iron mills have asked for a reduction in boiling and finishing scales and there may be some trouble between the mills and the Amalgamated in reaching a settlement of these scales. New orders and specifications continue to come into the mills in heavy volume and shipments of all kinds of products are much heavier now than at any time in the last year and a half. Prices are firm all along the line and the outlook is decidedly encouraging.

Ferromanganese.—The market is somewhat quiet, and prices are ruling low. One local interest is in the market for 300 tons and will probably close within the next week. We quote 80 per cent. foreign ferro at $40.50, seaboard, but it is stated that on one or two large recent inquiries $40 has been quoted. The rate on ferro from seaboard to Pittsburgh is $1.95 a ton.

Ferrosilicon.—There is a fair amount of new inquiry, and several small lots of 25 and 50 tons each have recently been sold at $61 to $62, delivered, Pittsburgh. All ferrosilicon sold after this date will be for duty on account of the buyer.

Rods.—Specifications against contracts for rods placed in April, and prior to May 15, when prices were $27 or lower, are coming in very freely and shipments by the mills are heavy. We quote Bessemer and chain rods at $29 and open hearth rods at $29 to 30, Pittsburgh. The higher price is quoted only on very small lots.

Skelp.—A good many new orders are being placed for this material, and specifications against contracts for grooved and sheared iron plates are coming in very freely. One mill rolling sheared iron plates reports that it is filled up for the next several months. Prices are firm and we quote: Grooved steel skelp at 1.30c. to 1.35c.; sheared, 1.40c. to 1.45c.; grooved iron, 1.50c. to 1.55c., and sheared iron skelp, 1.55c. to 1.60c., all for ordinary widths and gauges, f.o.b. Pittsburgh:

Steel Rails.—The past week was the best the Carnegie Steel Company has had in orders and specifications for light rails and standard sections for some months. The concern booked in the past week 24,000 tons of standard sections, of which 16,000 tons are for the Missouri Pacific System for delivery over the next two or three months, the other 19,000 tons placed by this road having gone to the Illinois Steel Company. Of the other 8000 tons, 2200 tons was for the Sewell Valley Railroad, West Virginia, the balance being made up of small orders. The concern also booked 1600 tons of light rails, and recently made a shipment of 4300 tons to Mexico. All three rail mills at Bessemer are in operation and running to slightly larger capacity than for some time. We quote standard sections at $28, at mill, while prices on light rails are as follows: 12-lb., $28; 16, 20 and 25 lb., $27; 30 and 35 lb., $26.75; 40 and 45 lb., $26, all in 250-ton lots, f.o.b. Pittsburgh. Over 250 tons and up to 500 tons, 60c. a ton less, and over 500 tons $1 a ton less. Splice bars are 1.50c., at mill, and the demand is good.

Plates.—The Southern Pacific Company has placed a contract with the Newport News Shipbuilding & Drydock Company for the building of four passenger and freight boats, which will require over 10,000 tons of plates and shapes, which will be furnished by the Carnegie Steel Company. The American-Hawaiian Company has placed an order for three boats with the Maryland Steel Company, all the plates and shapes to be furnished by that interest. The Jersey Central inquiry for 1500 steel cars is about closed, a good part of the order having gone to the Cambria Steel Company. The Philadelphia & Reading Railroad is in the market for 6000 to 7000 tons of plates and shapes, and there are also inquiries for several large riveted pipe oil lines, which, when placed, will take a very heavy tonnage of plates. Leading plate mills are now operating to larger capacity than for many months, the Homestead Works operating at present to about 80 per cent. Prices on plates are firm, and we quote ¼-in. and heavier at 1.25c. to 1.30c., but note that in some cases some mills are quoting as high as 1.35c., Pittsburgh.

Structural Material.—Inquiries continue very heavy, but no notably large local contracts were placed in the past week. The McClintic-Marshall Construction Company has taken 550 tons for a bridge over French Creek, at Franklin, Pa., and the American Bridge Company has taken 1500 tons for two viaducts for the western extension of the Chicago, Milwaukee & St. Paul, and about 1200 tons for a bakery building for the Ward-Corby Company, at Chicago. Several local fabricating interests that are pretty well filled up are not seeking business as urgently as they were some time ago. Prices continue firm, the general market on beams and channels up to 15-in. being 1.25c. for large lots and 1.30c., at mill, for small orders.

Bars.—Specifications against the heavy contracts for steel bars placed some time ago continue to come in very freely, and in spite of these heavy contracts, which led to the belief that most consumers were pretty well covered, a heavy run of new orders is coming into the mills and a good deal of tonnage is being booked. The failure to affect a settlement of the bar iron scale, which expires on June 30, is causing some uneasiness, and there may be a shutdown of the mills on July 1, pending settlement of the scale. With this in view, jobbers and consumers are urging the mills for shipments, and two leading makers of steel bars are already from five to six weeks behind in deliveries, and one leading interest is not taking any more new orders for steel bars for shipment prior to August 1, or later. It is probable another conference between the Western Bar Iron Association and the Amalgamated Association will be held within the next week or 10 days. We quote steel bars at 1.20c. to 1.25c., Republic and Cambria holding firm for the higher price, and iron bars at 1.30c. to 1.35c., f.o.b. mill, Pittsburgh:

Tin Plate.—The announcement made last week by the American Sheet & Tin Plate Company that commencing July 1 it would operate all its sheet and tin plate mills on an "open shop" basis was a distinct surprise to the trade, and what action the men employed in mills that formerly signed the scales will take in the matter is not yet known. It can be stated, however, that a good majority of the men have quietly expressed themselves as being in favor of continuing at work, scale or no scale, and will agree to accept the new scale of wages posted at these plants last week by the American Sheet & Tin Plate Company, which calls for a reduction of about 3.8 per cent. from tonnage rates now in force expiring on June 30. There will probably be some trouble in arranging a settlement of the tin plate scale with the independent tin plate mills that sign the scale, as one or two concerns have already stated they will not sign a scale calling for higher rates than have been posted by the leading interest. The Advisory Board of the Amalgamated Association is in session in this city at this writing, discussing the present scale situation in the tin plate trade. New demand for tin plate continues heavy, and specifications against contracts are coming in very freely, and have been largely accelerated by the prospective shutdown of some of the mills on July 1, pending settlement of the wage scale. The Demmler Works of the American Sheet & Tin Plate Company, containing 11 hot mills, has been put in shape for operation, and will be started up as soon as the men signify their willingness to work under the "open shop" plan. The leading interest is operating 94 per cent. of its serviceable tin mills. Prices are firm, and we quote 100-lb. cokes at $3.40 per base box.

Sheets.—A misleading statement has recently appeared to the effect that the Cambridge, Ohio, works of the American Sheet & Tin Plate Company would be started on June 21. This plant makes special sheets and has been in operation steadily for months. It is true, however, that the American Sheet & Tin Plate Company has started two of the four hot mills in its Piqua, Ohio, plant and has also started the Leechburg, Pa., works containing 11 hot mills and is now operating 70 per cent. of its serviceable hot sheet mills. New demand for sheets is showing gradual betterment and the mills are slowly getting up to normal capacity in operation. Several of the leading independent sheet mills that make specialties in sheets are operating to full capacity and are behind in orders. There is still some uneasiness in prices on the lighter gauges of black and galvanized sheets and also in roofing sheets, but this is not so pronounced as it was some time ago. We quote one-pass box annealed black sheets, No. 28 gauge, at 2.20c., and No. 28, galvanized, at 3.25c., but these prices are being shaded on good orders. The regular price of painted roofing sheets, No. 28, is 1.55c. per square and of galvanized, No. 28, is 2.80c. per square, for 2½-in. corrugations, but these prices are also being shaded.

Hoops and Bands.—Orders for these two products are gradually increasing, and the mills are entering more tonnage than for some time. Specifications against contracts are also coming in quite freely and shipments by the mills are fairly heavy. The nominal price of steel hoops is 1.40c. and bands 1.20c., steel card extras on the latter, but these prices are still being shaded to some extent.

Spelter.—The market is dull and prices are showing an easier tone. The general price quoted on prime Western grades is 5c., East St. Louis, or 5.12½c., Pittsburgh, but

on a firm offer for a large tonnage 4.95c., East St. Louis, and possibly a little less, could be done.

Railroad Spikes.—In addition to the contract for 15,000 kegs recently placed by the New York Central with a local interest, several other roads have made fairly heavy purchases, and more business is being placed in railroad spikes than for some time. The Missouri Pacific is reported to be in the market with a large inquiry, this road having just bought 35,000 tons of rails, about half of which will be laid at once. We quote railroad spikes at $1.60 to $1.65 for 5½ x 9-16 in., and $1.70 to $1.75, base, for the smaller sizes, in carloads and larger lots, 5c. per keg additional being charged for less than carloads.

Merchant Pipe.—Some fairly large inquiries are in the market, the Barnsdall interest inquiring for 100,000 ft. of 2-in. tubing, 60,000 ft. of 8-in. drive pipe, 20,000 ft. of 6⅝ casing and 20,000 ft. of 5 3-16 casing. The Manufacturers' Light & Heat Company, a local interest, is asking for 50,000 to 60,000 ft. of 6-in. line pipe and the West Virginia Natural Gas Company is in the market for 12 to 15 miles of 6⅝ casing. Some very heavy gas and oil line projects are being figured on, and at least part of this business is certain to develop within a short time. General demand for merchant pipe is active and shipments by the mill in May were heavier than in any one month for some time. Prices are firm, and it is stated that the minimum discounts of 81 and 5 off list on steel pipe and 78 and 5 on iron pipe are being strictly maintained.

Boiler Tubes.—There has been a noticeable improvement in new demand for both merchant and railroad tubes, but the mills could still take care of a very much larger amount of business than they are receiving. Regular discounts on both merchant and locomotive tubes continue to be more or less shaded.

Iron and Steel Scrap.—While there is still considerable buying in nearly all lines of scrap by consumers, new demand is not as urgent as it was, especially on heavy steel scrap, and prices on this material seem to be slightly easier. A week or two ago best grades of heavy steel scrap sold as high as $16.25, and a very heavy tonnage has sold at $15.50 and up to $16, delivered. Consumers now seem to be pretty well covered and are not willing to take in more material unless they can get it at practically their own figures. One large consumer of heavy steel scrap that buys through a broker is not willing to pay above $15.50 for heavy steel scrap, and dealers do not seem inclined to accept this price. The largest consumer of borings and turnings is offering $9.50 for borings and $11.50 for turnings, delivered at its mills, but these prices are also below what most dealers seem willing to accept. The result of this is that dealers are holding on to their scrap and consumers are not buying heavily, so that the tonnage of material actually moving is not as large as it was two or three weeks ago. We quote heavy steel scrap for Pittsburgh, Follansbee, Monessen, Steubenville, Leechburg and Sharon delivery at $15.50 to $16, delivered at these consuming points. Most dealers are holding their scrap for $16, and believe the market will recover very quickly any ground that it has lost recently. Prices on bundled sheet scrap are a little higher, also on sheet bar crop ends and machine shop turnings. Dealers quote about as follows: Cast iron borings, $9.75 to $10; bundled sheet scrap, $13 to $13.25, at point of shipment; No. 1 cast scrap for foundry use, $14.75 to $15; No. 2, $14; No. 1 railroad malleable, $14 to $14.50; sheet bar crop ends, $17.50 to $18; grate bars, $12; rerolling rails, $16 to $16.50; low phosphorous melting stock, 0.04 and under, $18.50 to $19; old car wheels, $16.25 to $16.50; locomotive axles, $22 to $22.50; locomotive tires, $17.50 to $18; machine shop turnings, $11.50 to $12; iron rails, $17 to $17.50; iron axles, $18.50 to $19, all per gross ton, f.o.b. Pittsburgh, unless otherwise stated. We note a sale of 300 tons of machine shop turnings for July delivery at about $12, Pittsburgh. The rail and scrap lists of the Pennsylvania Railroad close to-day, and it is understood bids by dealers on these lists were based on about the same figures as a month ago.

Coke.—Active work is now going on in the matter of consolidating some 50 or 60 of the leading coke operators in the Connellsville and other districts, the appraisers having been appointed, these being John M. Rayburn, a mining engineer of Pittsburgh; James B. Hogg, mining engineer of Connellsville, and John W. Grantham, a contractor and builder of coke plants, located at Scottdale, Pa. It is said these appraisers will cut down very materially the prices named in the options given by the coke operators, as some of them were based on prices as high as $5000 an acre for coal lands. Demand for furnace and foundry coke is decidedly better, and a large number of ovens in the Connellsville and other regions have recently been put in blast, and output of coke is showing a heavy increase. The Frick Coke Company alone has blown in upwards of 2000 ovens and other operators are blowing in more ovens nearly every day. Output of coke in the two Connellsville regions last week was about 285,000 tons, an increase over the previous week of about 7000 tons, and the heaviest output in any one week in the coke trade for some months. Standard grades of furnace coke for spot shipment can still be had at $1.50 to $1.55, at oven, but on contracts for delivery over last half of the year prices are higher, ranging from $1.65, minimum, up to $1.75 in net tons at oven. Standard makes of 72-hr. foundry coke are held at $1.80 to $1.90, net tons, at oven, and on contracts for last half of the year shipment from $2 up to as high as $2.40 is being quoted. Some grades of coke are being offered at slightly lower prices.

The J. E. Wright Company, Wheeling, W. Va., has been succeeded by the Thomas D. Prosser Company. T. D. Prosser, the head of the new concern, has been secretary of the J. E. Wright Company since its organization in 1903 and for two or three years has been the active member, Mr. Wright having devoted his attention largely to other interests. The business will be conducted on the same lines as heretofore. The company sells pig iron, coke, mill cinder and roll and squeezer scale, steel mine rails and steel and iron scrap; also paving block and brick, crushed limestone for concrete, ballast and road building, Portland cement, sewer pipe, sand, gravel, &c. Its offices are in the Schmulbach Building, Wheeling, W. Va.

Buffalo.

BUFFALO, N. Y., June 8, 1909.

Pig Iron.—The market continues strong in tone, but is somewhat quieter than for a few weeks as regards inquiry and new orders. Some foundries that have been dull for the past year or two are becoming busy, and shipments on contracts are increasing in volume. The position of furnacemen on last quarter deliveries is still to hold off awaiting better prices. The following covers the range of prices asked for current and third quarter deliveries, f.o.b. Buffalo:

No. 1 X foundry	$15.25 to $15.75
No. 2 X foundry	14.75 to 15.25
No. 2 plain	14.50 to 15.00
No. 3 foundry	14.25 to 14.75
Gray forge	14.25 to 14.50
Malleable Bessemer	15.00 to 15.50
Basic	15.50 to 16.00
Charcoal	19.50 to 20.00

Finished Iron and Steel.—Many of the mills have advanced their prices for steel bars to 1.25c. and for plates and shapes to 1.35c., Pittsburgh, including the Jones & Laughlin Steel Company, Lackawanna Steel Company, Cambria Steel Company and the Republic Iron & Steel Company and it is reported that business is coming in at the higher prices. The mills are very busy and some of them are considerably behind on deliveries. The demand for structural material continues good. One interest reports inquiry for 2500 tons for bridge work. Bids will be received this week for steel for the new addition to the Lafayette Hotel, 800 tons, and specifications will soon be out for steel for the addition to the Buffalo Realty Company's building for the Hengerer department store, requiring about 300 tons. The Lackawanna Steel Company is to furnish the steel for the electric railroad car shops to be erected by the Beebe traction syndicate at Syracuse.

Old Material.—The market is stronger and prices have advanced on nearly all lines, some of the advances being brought about by dealers buying to cover contracts. There is a good demand, from consumers, but the inclination of dealers to hold stock and put up prices acts as a bar to any considerable sales. We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel scrap	$15.00 to $15.50
Low phosphorus steel scrap	19.25 to 19.75
No. 1 railroad wrought	16.00 to 16.50
No. 1 railroad and machinery cast scrap	14.75 to 14.50
Old steel axles	17.50 to 18.00
Old iron axles	20.00 to 20.75
Old car wheels	15.00 to 15.50
Railroad malleable	13.75 to 14.50
Boiler plate	12.50 to 13.00
Locomotive grate bars	12.00 to 12.50
Pipe	11.50 to 12.00
Wrought iron and soft steel turnings	9.50 to 10.25
Clean cast iron borings	7.50 to 8.25
No. 1 busheling scrap	13.00 to 13.50

At the meeting of the Administrative Council of the National Metal Trades Association, held at Indianapolis, Ind., May 17, action was taken on the proposal to undertake with the National Founders' Association the joint employment of a salaried executive officer. A resolution was passed declaring that the time has not arrived to carry the co-operative action of the two organizations to the extent of employing one person to direct all their business operations. The view is expressed in the resolution, however, that the two associations should cooperate as closely as possible on matters of common interest, without attempting to join in administrative functions.

Cleveland.

CLEVELAND, OHIO, June 8, 1909.

Iron Ore.—A steady buying movement continues, contracts for quite a large tonnage being closed during the week, and the merchant ore firms regard the outlook for the season quite satisfactory. Three of the large interests are understood to be pretty well sold up on their season's output. Prices on standard ores are being firmly maintained, the only concessions reported being on off grade ores and ores that come under special classifications. Ore shipments for May were heavier than expected, the movement down the lakes during the month being 3,253,275 tons, as compared with 285,315 tons in May, 1908, and 5,621,285 tons in May, 1907. Shipments are increasing, and will be much larger this month than last. According to some estimates, the total movement for the season will be from 35,000,000 to 37,000,000 tons. No change has developed in the lake strike situation. Efforts of the State Arbitration boards and the National Civic Federation to effect a settlement have failed. The members of the Lake Carriers' Association have firmly maintained the stand that the open shop policy was not subject to arbitration. In spite of the strike more boats are in commission than are needed to move the tonnage now being offered. Ore prices at Lake Erie docks, per gross ton, are as follows: Old Range Bessemer, $4.50; Mesaba Bessemer, $4.25; Old Range non-Bessemer, $3.70; Mesaba non-Bessemer, $3.50.

Pig Iron.—The market is very quiet, but prices are firm and the tendency is still upward. Valley furnaces are now more generally asking $15 for No. 2 foundry for the last half and local furnaces are holding firmly to the same price for outside shipment. The latter have advanced their prices about 25c. a ton for city delivery. The only inquiry of any size pending is for 2000 tons of foundry iron for the last half. Practically no sales were made for delivery in this district during the week, but a local interest reports the sale of several 200 and 300 ton lots in adjoining territory. One local interest sold a 500-ton lot of No. 2 at $14.75, Valley furnace, for Ohio delivery. Local furnaces are pretty well sold up for the last half and are not anxious to take on more tonnage at the present time. Furnace C, of M. A. Hanna & Co., at Buffalo, which has been rebuilt and its daily capacity increased to about 175 tons, was blown in last week. We quote, delivered, Cleveland, for the last half, as follows:

Bessemer	$15.90 to $16.15
Northern foundry, No. 1	15.90 to 16.15
Northern foundry, No. 2	15.40 to 15.65
Northern foundry, No. 3	14.90 to 15.15
Gray forge	14.25 to 14.65
Southern foundry, No. 2	14.25 to 14.65
Jackson County silvery, 8 per cent. silicon	20.05

Coke.—A western New York steel interest has contracted for its furnace coke for the last half, amounting to 10,000 to 12,000 tons a month. Prices on furnace coke are slightly firmer. Some small contracts for foundry coke were made during the week, but the market is generally quiet. We quote standard Connellsville furnace coke at $1.60 to $1.65 for spot shipment and $1.70 to $1.75 for the last half. Connellsville 72-hr. foundry coke is held at $1.80 to $2 for spot shipment and $2.10 to $2.25 for the last half.

Finished Iron and Steel.—Mill agencies report a heavy volume of specifications for nearly all lines and mills are getting further behind on deliveries. Another leading independent producer has advanced its price on steel bars to 1.25c., Pittsburgh, the leading interest being the only one left that is making the 1.20c. quotation. As consumers are nearly all under contract, very few steel bar orders, and those only in small lots, are being taken on the 1.25c. basis. A leading independent interest has advanced its price on plates and structural material to 1.35c., Pittsburgh. The 1.30c. price is being generally maintained by other agencies and, in the case of plates, by a local mill which has enough tonnage on its books to keep it running 60 days or longer. The demand for plates continues to show an improvement. The leading interest reports that it is four weeks behind on deliveries on steel bars, three to four weeks on structural material and eight weeks on twisted bars. The demand for the latter is heavy at present. The demand for structural material continues good and inquiries have come during the past week from a number of consumers who failed to cover for all their requirements when lower prices were prevailing. The contract for the Anisfield Building, Cleveland, 600 tons, has been awarded to T. H. Brooks & Co., Cleveland. Plans for the Brown Building, for which contracts are being closed, may be changed so as to provide for a 15-story building and increasing the steel tonnage from 1300 to 3000 tons. The contract for the bins, trestle and other steel work to be erected in connection with the new Corrigan, McKinney & Co. blast furnace in Cleveland, 1400 tons, has been let to the Van Dorn Iron Works Company. The demand for shafting continues good and prices are slightly firmer. Business in sheets is still light and prices are being shaded. The demand for spikes holds up well. There is an improvement in the demand for light rails in car lots and prices are firm. An inquiry is pending from a coal company for its requirements for the balance of the year, 750 to 1000 tons. An inquiry developed during the week for 2000 tons of sheet bars for a new Ohio mill, on which a price of $22.75 was quoted. The demand for iron bars shows some improvement and prices are firm, at 1.25c. to 1.30c., Cleveland. The Republic Iron and Steel Company has advanced its price to 1.35c., Pittsburgh. Jobbers report considerable improvement in warehouse business.

Old Material.—The market has not been so active during the past week. Local mills are not buying, so that nearly all the sales made were for outside shipment. In spite of the inactivity the market is firm and several grades have advanced 50c. a ton. Some consumers are holding off, expecting a reaction, but dealers are not anxious to sell, believing that prices will advance. A round lot of old steel rails, offered by the Lake Shore Railroad last week, brought $17 per ton. The Baltimore & Ohio Railroad has a list out of about 4000 tons. Dealers' prices per gross ton, f.o.b. Cleveland, are as follows:

Old steel rails	$15.00 to $15.50
Old iron rails	16.50 to 17.00
Steel car axles	19.00 to 19.50
Old car wheels	14.50 to 15.00
Heavy melting steel	14.00 to 14.50
Relaying rails, 50 lb. and over	21.50 to 22.50
Agricultural malleable	12.50 to 13.00
Railroad malleable	14.00 to 14.50
Light bundled sheet scrap	8.00 to 8.50

The following prices are per net ton, f.o.b. Cleveland:

Iron car axles	$17.50 to $18.00
Cast borings	7.00 to 7.50
Iron and steel turnings and drillings	8.50 to 9.00
Steel axle turnings	9.50 to 10.00
No. 1 busheling	12.50 to 13.00
No. 1 railroad wrought	13.50 to 14.00
No. 1 cast	12.50 to 13.00
Stove plate	10.50 to 11.00
Bundled tin scrap	10.00 to 10.50

New York.

NEW YORK, June 9, 1909.

Pig Iron.—The market has been rather quiet, but continues strong. There are some quite large inquiries from pipe makers, but these are interpreted as feelers to reach figures on which bids on pipe may be based. We quote $16.75 to $17 for No. 1 Northern foundry, $16.25 to $16.50 for No. 2 foundry and $15.50 to $15.75 for No. 2 plain, at tidewater. Alabama iron is quoted $16.25 to $16.50 for No. 1 foundry and $15.75 to $16 for No. 2 foundry.

Steel Rails.—The tonnage which is coming up in Eastern territory is small. Among the orders placed is 4000 tons for the Erie road. Among recent export sales is a lot of about 2000 tons to Chili.

Cast Iron Pipe.—Bids are being opened to-day on the contract for the extension of the high pressure water service in this city, which will require about 14,000 tons of cast iron pipe and 1700 tons of specials. High pressure service is also in contemplation for Baltimore. Otherwise current business is light and occasionally low prices are being made. We quote on the basis of $23.50 per net ton for 6 in. at tidewater.

Ferroalloys.—There is an encouraging number of inquiries in the market for ferromanganese for next year and under a good demand the tendency is toward slightly higher prices. Some business has been reported for next year and dealers' quotations for early deliveries range from $41 to $42. The good supply of ferromanganese on hand has been a factor in keeping the price down, but the increased demand and the disposition shown by buyers to make purchases for next year have given the market an upward trend. The situation regarding ferrosilicon is an interesting one, because of the wide difference in current quotations. There have been some good sales, one to a large steel producing interest.

Structural Material.—Considerable work is still being figured on in New York, 20,000 to 25,000 tons being about ready for award. Revised bids were taken on 4500 tons of steel for the Vanderbilt Hotel and the post office at the Pennsylvania Railroad terminal is held up because of the withdrawal of two low bidders on the general contract. For the Hewitt-Bryce Building, involving 5000 tons of steel, the contract has gone to the Thompson-Starrett Company. The Eastern Steel Company has taken two local buildings, one a loft building and the other the new structure that will replace the Hotel Metropole at Forty-second street and Broadway. At Boston, the Reciprocity Mill contract, calling for 2100 tons of steel, is about to be let. Among recent new inquiries are those for 3200 tons of steel for the City Hospital, San Francisco, and 2000 tons for the Denver Gas & Electric Company, Denver, Col. The pending business is largely for buildings, railroad bridge contracts having been mostly disposed of in April and May. Recent car and vessel business have caused a very fair demand for structural shapes. On ordinary business for plain material, 1.46c., New York, is quoted by most structural mills, and material cut to length is sold from stock at 1.75c.

Bars.—The activity in bar iron noted a week ago continues, and some manufacturers have advanced their prices to a minimum of 1.35c. at eastern Pennsylvania mill for refined iron, or 1.45c., tidewater. On larger business competition is still keen, however, and 1.40c. is still heard of. Steel is also stronger and on larger deliveries 1.41c. tidewater is more commonly quoted. None of the iron rolling mills shows any eagerness to take contract business on any scale at present prices.

Plates.—The American-Hawaiian Steamship Company's contract for three vessels to be built at Sparrows Point and other recent shipyard business have given a little stimulus to the plate market. The plates for the three vessels referred to may be furnished by a western Pennsylvania mill. We quote ship plates and tank plates at 1.46c., tidewater.

Old Material.—The market has been generally quiet and consumers have shown no haste to buy. Perhaps most interest is taken in steel melting scrap in view of the greater activity in such material in Central and Western markets, but such interest is largely sentimental. The eastern Pennsylvania mills appear to be moderately well supplied for the immediate future. The recent inquiries for melting steel from New England have resulted in but little business, and purchases for that territory in the New York market will in any event be but comparatively small and only due to unusual conditions. The June lists of the Reading and the Central of New Jersey amount together to about 4000 tons, or considerably less than the average offerings of a number of months. The present inaction of consumers may be due in part to the fact that they are awaiting the disposal of the railroad offerings. We quote as follows, per gross ton, New York and vicinity:

Old girder and T-rails for melting	$13.00 to $13.50
Heavy melting steel scrap	13.00 to 13.50
Relaying rails	20.50 to 21.00
Old iron rails	15.50 to 16.00
Standard hammered iron car axles	19.00 to 19.50
Old steel car axles	17.50 to 18.00
No. 1 railroad wrought	15.50 to 16.00
Iron track scrap	13.00 to 13.50
No. 1 yard wrought, long	13.50 to 14.00
No. 1 yard wrought, short	12.50 to 13.00
Light iron	8.00 to 8.50
Cast borings	8.50 to 9.00
Wrought turnings	9.50 to 10.00
Wrought pipe	12.50 to 13.00
Old car wheels	14.50 to 15.00
No. 1 heavy cast, broken up	13.00 to 13.50
Stove plate	10.50 to 11.00
Locomotive grate bars	10.50 to 11.00
Malleable cast	14.00 to 14.50

Metal Market.

NEW YORK, June 9, 1909.

Copper.—The fact that five large buyers, including the General Electric Company and the Roebling interests, entered the market in the past week and made purchases aggregating 5,000,000 lb., has helped to sustain the copper market. Notwithstanding that slightly lower prices have been quoted in London, it is not thought by those familiar with the situation that the metal will be quoted here at anything less than the prevailing prices for some little time. While the London market invariably has its effect on prices here, the slight advances in New York in the last few days are not attributed to the purchases for export recently made, as the fact was taken into consideration locally that some of that buying was speculative. Accordingly the reports of slight reductions in London quotations have not as yet affected the domestic trade. The Metal Exchange's stronger prices in the week have been on the strength of the increased demand, and although there has not been any unusual amount of buying in the past three days the opinion prevails that the prices established will be maintained. Electrolytic can now be had for 13.62½c., and sales of lake at 13.75c. were reported this morning, although some sellers are holding for 14c., on the expectation that the good demand from large interests will encourage smaller buyers to come into the market. In London to-day the price established for spot was £60 7s. 6d., and for futures £61 5s., a reduction under the figures established yesterday. The market was reported as being weak and the sales of spot were 600 tons and futures 1400 tons. The exports of copper so far this month have amounted to 8439 tons.

Pig Tin.—Tin advanced again to-day, and the market is in a better condition than for some time. It is stated that the successive slight advances of the week are not due to any great demand for the metal, but rather to a healthy consumption and an encouraging outlook for the future. The prices established during the week for 5-ton lots were:

	Cents
June 3	29.10
June 4	29.20
June 7	29.15
June 8	29.10
June 9	29.50

The above prices are the lowest obtained according to all accounts, and the slight fluctuations indicate that the buying has been very close, so it is possible that better prices may be established shortly. Quotations in London to-day were £134 for spot and £135 7s. 6d. for futures, which is a material advance over the quotations of yesterday. The sales of spot tin in London were 280 tons, and of futures 950 tons, showing an increasing demand.

Lead.—The market is in better condition than for some weeks, due to the belated coming of the long looked for spring business. While the American Smelting & Refining Company continues to quote 4.35c., as was indicated last week, higher prices have been established in the trade generally, and at present 4.40c. is quoted for spot.

Spelter.—There is more activity in this market, and the price has been advanced to 5.50c., which means a general advance of about ⅛c. all along the line. This is not due to any great demand, but it has been admitted that producers of spelter have for some time been close to cost of production in some cases.

Antimony.—The arrivals of antimony have fallen off but slightly and the quotations remain the same: Hallett's at 7.75c., Cookson's at 8.25c. and the outside brands around 7.50c. There is little shading on these prices as the demand is steady and sellers are fairly satisfied with existing conditions.

Tin Plate.—There is no great demand for tin plate and prices remain the same as quoted here last week, with very little shading, if any. Quotations for 100 lb. I C coke plates are $3.64, New York, and $3.45, Pittsburgh, with a 5 per cent. rebate on large orders. Welsh plates are held firm at 11s. 9d.

Old Metals.—The following dealers' selling prices represent the New York market:

	Cents.
Copper, heavy cut and crucible	13.00 to 13.25
Copper, heavy and wire	12.75 to 13.00
Copper, light and bottoms	11.75 to 12.00
Brass, heavy	9.50 to 9.75
Brass, light	7.50 to 7.75
Heavy machine composition	12.25 to 12.50
Clean brass turnings	8.25 to 8.50
Composition turnings	10.00 to 10.50
Lead, heavy	4.15 to 4.20
Lead, tea	3.85 to 3.90
Zinc scrap	3.87½ to 4.00

Iron and Industrial Stocks.

NEW YORK, June 9, 1909.

In the iron and steel stocks the week has been marked by a somewhat excited speculation in the common stock of the United States Steel Corporation and by a sharp advance in the preferred stock. Announcement was made June 3 that 100,000 shares of common stock had been sold to a syndicate of Paris banking houses, so that there might be dealings in the stock on the Paris Bourse. The stock thus sold will be held in trust in New York and the syndicate's certificates will be traded in in Paris. The highest point in the United States Steel stocks was reached June 3, at 69⅜ for the common and 128⅜ for the preferred. The former made a net gain that day of 2 and the latter of 5⅞ points. Republic preferred also made a sharp advance in the past week, due in part to the resumption of dividends. The range of prices on active iron and industrial stocks from Thursday of last week to Tuesday of this week was as follows:

Allis-Chalm., com..	15¼- 16¼	Railway Spr., com.	45½- 46¾
Allis-Chalm., pref..	51¼- 52⅝	Railway Spr., pref.	107 -108
Beth. Steel, com...	29½- 33⅜	Republic, com.....	31 - 34¼
Beth. Steel, pref..	61½- 64¼	Republic, pref.....	98 -108½
Can, com.....	12⅝- 13¾	Sloss, com.....	83½- 85½
Can, pref.....	80⅝- 86	Pipe, com.....	34 - 35½
Car & Fdry, com..	56¾- 58	Pipe, pref.....	79 - 86⅝
Car & Fdry, pref...	116 -117	U. S. Steel, com...	66⅞- 69⅜
Steel Foundries....	46 - 51	U. S. Steel, pref...	122½-128⅜
Colorado Fuel.....	41¾- 45	Westinghouse Elec.	83¾- 87
General Electric...	159 -161¼	Chi. Pneu. Tool...	23½- 24
Gr. N. ore cert....	74¼- 76½	Am. Ship, pref....	108¼-109
Int. Harv., com...	84⅜- 86⅞	Cambria Steel.....	42 - 43½
Int. Harv., pref...	120½-123	Lake Sup. Corp....	28¼- 29¼
Locomotive, com...	59¼- 62½	Warwick	8¾- 9
Locomotive, pref...	115½-117	Crucible St., com..	9 - 10
Nat. En. & St.,com.	15⅝- 18¼	Crucible St., pref..	69½- 71¾
Nat. En. & St.,pref.	87¼- 90	Harb.-W. Ref., com.....	18½
Pressed St., com...	43 - 45¼	Harb.-W. Ref., pref.	83 - 85
Pressed St., pref...	103½-104½		

Last transactions up to 1.30 p.m. to-day are reported at the following prices: United States Steel common 66⅝, preferred 124⅝; Car & Foundry common 56¼, preferred 117½; Locomotive common 60⅝, preferred 116⅞; Steel Foundries common 48¼; Colorado Fuel 43; Pressed Steel common 43¾, preferred 104; Railway Spring common 45¼; Republic common 32, preferred 106¼; Sloss-Sheffield common 83½; Cast Iron Pipe common 34¾, preferred 85; Can common 12⅝, preferred 83½.

Iron and Steel Bonds.

Chisholm & Chapman, 18 Wall street, New York, report the following quotations:

	Bid.	Asked.
Bethlehem Steel 1st ext. 5s, January 1, 1926	..	90
Bethlehem Steel purchase money 6s, August, 1998	116¼	118¼
Buffalo Iron Company 5s, October, 1925	97	100
Buffalo & Susquehanna Iron 1st 5s, June, 1932	99¾	..
Buffalo & Susquehanna Iron deb. 5s, January, 1926	95	98
Dominion Iron & Steel 5s, July, 1929	90½	..
La Belle Iron Works 1st 6s, December, 1923	103½	106
Lackawanna Steel 1st 5s, April, 1923	98½	100

Maryland Steel 1st 5s, February, 1922	101	..
Pennsylvania Steel 1st 5s, November, 1817	101	..
Pennsylvania & Maryland Steel 6s, September, 1925	..	109
Republic Iron & Steel 1st 5s, October, 1934	100	100½
Sloss Iron & Steel 1st 6s, February, 1920	105	108
Sloss Iron & Steel consol. 4½s, April, 1918	95	97
Jones-Laughlin 1st 5s, May 1, 1939	100⅛	100½
United States Steel Corporation.		
Collateral Trust 5s, Series A, C, E, April, 1951	114½	115½
Collateral Trust 5s, Series B, D, F, April, 1951	114½	115½
Sinking Fund 5s, April, 1963	105½	105¾
Union Steel 1st 5s, December, 1952	105	106
Clairton Steel 5s, 1908-1913	100	..
St. Clair Furnace 1st 5s, 1910-1939	100	..
St. Clair Steel 1st 5s, 1908-1926	100	..
Illinois Steel deb. 5s, January, 1910	100¼	..
Illinois Steel 5s, April, 1913	100⅝	..

All bonds quoted "and interest."

The report of the American Steel Foundries for the quarter ending April 30, 1909, makes the following showing, as compared with that for the corresponding quarter in 1908:

February 1 to April 30—	1909.	1908.
Net earnings	$238,282	*$114,767
Other income	4,516	33,148
Total income	$242,798	*$81,619
Interest	†$92,965	$58,075
Sinking fund	26,758	26,250
Depreciation	34,275	55,750
	$153,998	$140,075
Balance net income	88,800	*221,694

* Deficit. † Interest charges for 1909 include interest on borrowed money, $522; interest on debentures, $34,368; interest on bonds outstanding and in sinking funds, $58,075.

Dividends.—The Republic Iron & Steel Company has declared a quarterly dividend of 1¾ per cent. on the preferred stock, thereby restoring the stock to the former 7 per cent. annual basis, and an extra dividend of ¼ per cent. on account of the back dividends. Both dividends are payable July 1. The last dividend on the preferred stock was paid in April, 1908.

Canadian Industrial Notes.

TORONTO, June 5, 1909.—Application has been made to the municipal authorities of Toronto by the Polson Iron Works Company for a lease of 50 acres of city lands, upon which the company proposes to extend its present plant so as to go into shipbuilding on a large scale. It proposes also to establish a drydock.

Contracts have been signed on behalf of the Ontario Hydro-Electric Power Commission for the equipment and machinery for the dozen transformer stations of the Commission's transmission system. The contracts call for an aggregate expenditure of about $1,000,000. About two-thirds of the work goes to the Canadian General Electric Company of Peterborough and the rest to the Westinghouse Company of Hamilton, Ont.

The rod mill at Sydney, N. S., is now working double shift.

C. D. Warren, Toronto, president of the Lake Superior Corporation, says that before the end of June a definite statement will be made as to changes contemplated in the plant of the Algoma Steel Company at Sault Ste. Marie, Ont. It has been stated on the authority of General Manager W. G. Franz that a structural steel plant will be erected this year.

The Atikokan Iron Company's blast furnace at Port Arthur is nearly ready for blowing in, after having been idle for about 18 months. New machinery from Cleveland, Ohio, for handling ore and pig iron has been installed. Work has also been resumed at the company's iron mines on the Atikokan Range. It is stated that if a better market for the pig iron produced at Port Arthur is not developed in the near future the company may build a plant to consume its own pig iron. At present Chicago interests are negotiating with the municipal council at Port Arthur with a view to establishing a radiator plant which will take part of the output of the blast furnace.

The municipality of Port Arthur entered into an agreement last week with the Western Dry Dock & Shipbuilding Company, represented by A. F. Bowman. The company, which is said to be made up principally of Cleveland capitalists, plans to build a dry dock capable of receiving the largest vessels on the lakes. Three hundred men are to be employed in the construction work. A by-law embodying the agreement will shortly be submitted to the rate payers for approval. C. A. C. J.

International Congress for Testing Materials.

The fifth congress of the International Association for Testing Materials will be held September 7 to 11 at Copenhagen, Denmark. Announcemen' is made of a very full programme of papers. Among the papers and reports to be presented before the Metal Section are the following: "Special Steels," by Prof. L. Gullet, Paris; "Heat Treatment of Spring Steel," by Lawford H. Fry, Paris; various reports on hardness testing and on impact tests; report by Dr. Richard Moldenke, Watchung, N. J., and paper by the brothers Sulzer, Winterthur, Switzerland, on the "Testing of Cast Iron"; report by J. W. Esterline, Lafayette, Ind., on "Magnetic and Electrical Properties of Materials in Connection with Their Mechanical Testing"; report on "Nomenclature of Iron and Steel, with a Definition of Their Microscopic Constituents," by H. M. Howe, New York, and A. Sauveur, Boston; "International Specifications for Testing and Inspecting Iron and Steel," by A. Rieppel, Nuremberg; report on "Paints for Metallic Structures," by S. S. Voorhees, Washington, D. C.; "A Plea for International Investigation Concerning Protective Coatings for Iron and Steel," by J. Cruickshank Smith, London; "Studies on the Qualities of Rails as Basis for Conditions of Tender for Rails," by Dr. N. Belielubsky, St. Petersburg.

The membership of the International Association at the close of 1908 was 1900, including 293 from the United States, 370 from Germany, 163 from France, 231 from Russia, 193 from Austria and 75 from Great Britain.

Allegheny Steel Company.—This company, with offices in the Farmers' Bank Building, Pittsburgh, and operating an open hearth plant, plate and sheet mills at Brackenridge, Pa., has recently increased its capital from $300,000 to $1,350,000. It has absorbed the Interstate Steel Company, also located at Brackenridge, Pa., having a plant containing six hot mills and five cold mills, its product being sheets for special purposes, with capacity of 25,000 tons per year. This latter interest was identified heretofore with the Allegheny Steel Company, the two having the same officials, but it has now been absorbed entirely and it will be operated and its products sold by the Allegheny Steel Company. There are negotiations also for the purchase of the Reliance Tube Company, which operates a plant at Brackenridge, Pa., and it will probably be taken over in the near future. The Allegheny Steel Company put in operation last week a new washer factory, contained in a steel building, 50 x 80 ft., with a capacity of about five tons per day of wrought washers.

A Bar Mill Consolidation.—An effort seems to be culminating to consolidate a number of Eastern iron bar mills and chain works, under the auspices of E. L. Harper, known in the iron trade; E. R. Chapman & Co., who have been identified with Virginia iron properties, and the Hudson Trust Company in New York. The details of the new merger are being withheld, but it does not appear that any of the really important iron mills of the territory east of the Allegheny Mountains have become identified with the undertaking, which is not regarded as strong in the trade. It is reported that six bar mills are to be included, there being mentioned the Lebanon Rolling Mill Company, the New Haven, Bristol and Susquehanna mills, the Lebanon Chain Works and another chain plant. The new consolidation is to bear the name of the Iron and Steel Products Company. It will make iron bars, bolts, spikes and chains.

W. A. Garrett, president of the Seaboard Air Line Railway, and since the receivership executive officer for the receivers, has been elected to the vice-presidency of the T. H. Symington Company, Rochester, N. Y., manufacturer of railroad equipment and malleable iron castings. He will enter upon his new duties as vice-president and in charge of sales about November, 1909, at which time it is expected that the new plant of the Symington Company will be ready to begin operations.

OBITUARY.

FREDERICK W. SPONSLER, treasurer of the Millersburg Fifth Wheel Company, died at Millersburg, Pa., May 18.

JOHN R. COUCH, New York manager of the Bishop & Babcock Company, Cleveland, Ohio, manufacturers of brass specialties, died in New York May 27, aged 57 years. He was born in Carrollton, Ohio, and for a number of years was engaged in the hardware trade at Canton, Ohio. He became New York manager for the Bishop & Babcock Company in 1898. He was president of the Manufacturers and Dealers' League, a New York brass goods organization, and a director in the H. D. Berner & Winterbauer Company.

JOHN F. LOWRY died at Cumberland, Md., May 30, aged 85 years. He was a pioneer manufacturer of charcoal iron at Hopewell, Bedford county, Pa.

MARK W. WATSON, a well known financier and business man of Pittsburgh, died in Philadelphia June 2. He was president of the Exchange National Bank, Standard Underground Cable Company and Monongahela Water Company, all of Pittsburgh.

JOHN N. BROWN, Holyoke, Mass., manufacturer of wire cloth and Fourdrinier rolls, died June 4, aged 69 years. He was a native of South Orange, N. J. He went to Holyoke 25 years ago and was employed by the Buchanan & Bolt Wire Company, and afterward associated himself with Joseph J. Sellers as Brown & Sellers, and later continued the firm name with his son, W. Chapman Brown, as partner. He is survived by his wife, a daughter and two sons.

LOUIS G. LAUREAU, a well known metallurgist, died suddenly at Yonkers, N. Y., June 6, at the age of 68. He was long associated with the late Alexander L. Holley, as his chief assistant, was for a while a member of the firm of Gordon, Strobel & Laureau, and for many years acted as a metallurgical expert in patent causes. He possessed an accurate knowledge of the steel industry of this country and of Belgium and France.

MILTON JACKSON, president of the Miller Lock Company, Frankford, Philadelphia, Pa., died June 5, in Shanghai, China. Mr. Jackson was on a business and pleasure trip around the world, accompanied by his wife. The remains will be brought to Philadelphia for burial, arriving at San Francisco on the Mongolia about the middle of July. Mr. Jackson was in his 64th year. He was a graduate of the University of Michigan and became manager of the Miller Lock Company in its infancy in 1871. The firm prospered under his management, its business increasing to such an extent that in 1888 larger quarters were secured at the present location in Frankford. Mr. Jackson was a member of the Psi Upsilon fraternity, a trustee of the George School in Bucks County, Pa., a member of the National Association of Hardware Manufacturers and of the Hardware Merchants and Manufacturers' Association of Philadelphia. There are four children, Edward S. and Arthur C. Jackson, who are connected with the Miller Lock Company; Henry W. Jackson and Mrs. William A. Shoemaker, of Plainfield, N. J.

E. D. JONES, founder of the industrial works that developed into the Detroit Shipbuilding Company, died June 8 at Detroit, aged nearly 90 years.

More New Work for Atlantic Shipyards.

The four steel vessels for the Southern Pacific Railroad Company, contract for which has just been placed with the Newport News Shipbuilding Company, will be of 4000 gross tons burden each. They will be 400 ft. long, 53 ft. beam, 36 ft. in depth, and will cost something over $2,000,000. They are for the Atlantic Steamship Lines of the Southern Pacific, plying between New York, New Orleans and Galveston.

The Navy Department at Washington awarded contracts June 8 for four speedy torpedo boat destroyers. The Bath Iron Works, Bath, Me., will build one vessel for $659,500; the New York Shipbuilding Company, one at $648,000; William Cramp & Sons, Philadelphia, one at $637,000, and the Newport News Shipbuilding Company, one at $629,000. The contract for a fifth boat will probably be awarded to the Fore River Shipbuilding Company, Quincy, Mass., at $644,000.

The American-Hawaiian Steamship Company has contracted with the Maryland Steel Company for the construction of three steamships of 9000 tons each at a cost of $1,750,000. The vessels will ply between the United States and Hawaii.

Reorganization of Milliken Bros., Inc.

Creditors of Milliken Brothers, Inc., New York, have plans practically completed for a temporary reorganization and the discharge of the receivers. The assent of nearly all the creditors and all but a fraction of the stockholders had been secured early this week and the creditors' committee having the matter in charge believed no opposition would be made in court to the carrying out of the arrangement. A former scheme contemplated raising $1,500,000 in cash and starting up not only the fabricating works but the steel plant on Staten Island as well. It was, however, found impracticable to raise this amount of money and nothing will be done with the steel works at present. One advantage of the new plan is that it can be tried out without any large financing, as the receivers have succeeded not only in meeting the interests on the company's $3,000,000 of bonds, but have a balance of $500,000 cash. Additional cash will need to be provided for, either by notes or bonds, probably not more than $500,000. The company has outstanding, in addition to its bonds, $5,500,000 of stock, of which $3,000,000 was preferred stock. It is expected the new plan can be carried out without scaling down capital, bonded indebtedness or claims.

There is a sentiment in the creditors' committee in favor of selling the steel plant and there has been some discussion of the matter with a possible purchaser. The fabricating plant has orders ahead for a considerable period. Gates W. McGarrah, president of the Mechanics' National Bank, New York, is chairman of the committee, and among his associates are Gilbert G. Thorne, of the National Park Bank; A. A. Fowler, resident partner of Rogers, Brown & Co., and William H. Wallace, of William H. Wallace & Co.

Labor Notes.

The threatened strike of the machinists of the Baltimore & Ohio Railroad was called June 3 by the International Association of Machinists. Reports differ as to the number of men on strike. The total number ordered out from the various machine shops is 2100. Reports to the company up to June 5 indicated that not more than 500 or 600 men walked out. The difficulty originated from the introduction of the piece-work system at the Mount Clare, Md., shops.

Francis E. Thoman, business agent of the Structural Iron Workers' Union, Chicago, was indicted last week on a charge of perjury in his testimony for the defense in the trial of the structural labor leaders recently convicted of accepting bribes.

A new branch of the National Society for the Promotion of Industrial Education has just been formed in Indiana. A. C. Atkins, president of E. C. Atkins & Co., Inc., Indianapolis, was elected president. Dr. S. C. Dickey, of the Winona Technical Institute, and J. L. Ketcham, Brown-Ketcham Iron Works, Indianapolis, are also connected with the movement.

The Orford Copper Company, New York, has been awarded a contract by the Government for furnishing the full set of propeller wheels for the battleship Florida, now building at the New York Navy Yard. These wheels are 9 ft. 2 in. in diameter, weigh about 5500 lb. each, and will be made of Monel metal. The Orford company has orders for 20 other propellers required on Government vessels.

The Machinery Trade.

NEW YORK, June 9, 1909.

The first week of the month brought out a fair volume of business, about equal to that of the previous week or two, but no transactions covering large lots of tools were reported. Inquiries were a trifle better, one being received from the Delaware, Lackawanna & Western Railroad for 12 electric traveling cranes, aggregating about $25,000 in value. No other extensive inquiries nor sizable orders were reported; the few large projects that have been expected for some time have not yet materialized and the trade is somewhat disappointd at the delay. It is practically certain, however, that these will be received shortly, and machinery houses will be both bidding on a large list of tools and receiving orders against an extensive list, bids upon which were closed some time ago. Notwithstanding the light demand for tools from the railroads and important industrial interests, houses are somewhat encouraged by the steady volume of small business and feel that with only a fair amount of business from the roads trade would reach a normal basis. Dealers report more second-hand machinery offered than for some time.

Important Inquiry for Traveling Cranes.

Specifications have been issued by the Delaware, Lackawanna & Western Railroad for 12 electric traveling cranes for its new shops at Scranton, Pa., aggregating in value about $25,000. This list, which is one of the largest for electric traveling cranes issued in this territory for some time, covers two 120-ton, two 20-ton, one 30-ton, two 15-ton, one 10-ton and four 1500-lb. cranes. These cranes, with the extensive list of machine tools issued some time ago, make a large amount of machinery that will be purchased by the road for the new Scranton shops. Bids on the machine tools were sent in last February and it was expected that purchases would be made by this time. The delay on the part of the road is causing some disappointment, but it is likely that the large amount of machine tools will be purchased within the next few weeks.

The St. Louis Southwestern Railroad contemplates making important improvements at its shops at Tyler, Texas, where it is understood considerable new machinery will be installed.

The Georgia, Southern & Florida Railroad is doing some preliminary grading at Macon, Ga., in order to prepare later for the contemplated enlargement of its shops. It has not been definitely decided when the work of construction will be started, nor has the time of construction of the proposed repair shops at Valdosta been determined.

The Barnes Gear Company, Oswego, N. Y., manufacturer of automobile axles and gears, has awarded contract for the construction of its new plant. The new building is for machine shop purposes and will be three stories, 60 x 80 ft. The company has also taken a long term lease on the adjoining building. The machinery at the present plant will be moved to the new location and the following additional machinery will be purchased: Eight lathes, ranging from 14 to 16 in., with 6-ft. bed; six thread millers, special type, details of which will be furnished on application; eight to ten drill presses, six radial grinding machines, three milling machines, ranging from No. 2 to No. 12; one hardening furnace and three or four additional electric motors.

The Haywood Wagon Company, Baldwinsville, N. Y., has not yet definitely decided whether it will move its plant to Newark, N. Y., but if it does the company will be in the market for a 150-hp. Corliss engine, two 100-hp. boilers, a heavy bulldozing machine, alligator shears, four-sided feloe planer, 75-lb. Bradley hammer and other machines. The new plant contemplated will be used for the manufacture of the company's patent dumping wagons and will consist of a reinforced concrete main building, 96 x 500 ft.; warehouse, 64 x 200 ft., two stories; engine room, boiler room and fuel room, each 25 x 45 ft.

The J. H. Meade Company, 242 Fourth avenue, New York, is preparing to erect an Eastern plant for the manufacture of its line of gas radiators and gas logs. The company now has a plant in the West, where its products are manufactured, but because of the rapid growth of its Eastern business it has been found necessary to erect a complete plant here. Accordingly J. H. Meade, the president of the company, is at present in Pennsylvania looking over a number of sites for the prospective plant, and it is probable that one will be selected in the vicinity of Grove City. The company proposes to erect a plant to employ about 100 men at first, and this will include a foundry, machine shop, varnish and lacquering department, power plant, &c. The sizes of the buildings to be erected have not been entirely decided upon as yet, as the company is willing to acquire an existing plant if one suitable can be found. Mr. Meade will return to New York, it is stated, within the next 10 days.

The Alabama Fire Brick & Mfg. Company, Birmingham, Ala., capitalized at $50,000, expects to be in the market in the next 30 days for the machinery to equip its new plant at Riverside, Ala.

Additional Machinery will be purchased by the Frog, Switch & Mfg. Company, Carlisle, Pa., which will rebuild its plant that was recently destroyed by fire. Plans for the new plant have not yet been completed, but the shops will cover about 54,000 sq. ft. of floor space, will be of iron and brick construction, and will have a capacity of from 18,000 to 20,000 frogs and switches per year. It is likely that the machines will be run in groups by electric motors.

The Auburn Auto Pump Company, Auburn, N. Y., recently organized, has absorbed the Leather & Brass Mfg. Company and will equip a new plant for the manufacture of power auto pumps. For the equipment of the plant the company will require multiple drills, turret lathes, machine lathes and other tools. E. N. Ross is president; R. J. Benham, vice-president; L. Heazlit, secretary, and C. W. Storke, treasurer.

The Bessemer Gas Engine Company, Grove City, Pa., will build an addition to its plant, 130 x 273 ft., of structural steel and cement block. Contract has been awarded for the excavation work, but the structural steel has not yet been arranged for.

Considerable new machinery will likely be purchased by the Virginia Mechanics' Institute, Richmond, Va., within a short time. At the closing exercises it was announced that the institute would install a machine shop and blacksmith shop this summer, so as to have them ready for operation by the beginning of the fall session.

Purchases of a large amount of power plant equipment will be made in the near future by the Grand Falls Power Company, 542 Fifth avenue, New York, which is to construct a hydro-electric plant on the St. Johns River, at Grand Falls, New Brunswick. Some of the water wheels, generators and other equipment for the preliminary development have been contracted for, and the company will take up the purchase of the large units later. The main power house when completed will contain eight 10,000-hp. units. The Frank B. Gilbreth Company, New York, has the contract for the construction of the plant.

D. G. Ziegler & Co., consulting architects and engineers, Mutual Life Building, Jacksonville, Fla., who, as recently noted, have been retained as consulting engineers for several Southern hydro-electric developments, have organized the Ziegler Construction Company, which will purchase operation plants and then will contract for whatever machinery will be needed for each plant and supplies for pole lines, &c. Among recent new developments for which the firm has been retained as engineer is the hydro-electric plant on the Allapaha River, near Jasper, Fla., where about 10,000 hp. will be developed; Double Bridge Creek, near Geneva, Ala., where 5000 hp. will be developed, and Abbey Creek, near Abbeville, Ala., where 8000 hp. will be developed by the Abbeville Power & Mfg. Company.

Bids will be opened by the Department of Water Supply, Gas and Electricity, New York, June 23, for constructing a pumping station and sewage disposal plant at the village of Mt. Kisco, N. Y. The surety required is $30,000.

Bids will be opened Wednesday, June 16, at the office of the Department of Gas, Water Supply and Electricity, New York, for a water purification plant to be erected at Oakland Lake, in the Borough of Queens. A security of $20,000 is required from bidders, and specifications may be obtained at the office of the chief engineer.

The Board of Water Commissioners of Cohoes, N. Y., will receive bids until June 17 for mechanical filters and appurtenances, stand pipe and pumping machinery.

Business Changes.

Owing to the large demand for flexible roller bearings in Detroit and vicinity, where a large proportion of the automobile factories are located, the Hyatt Roller Bearing Company has moved its general sales offices from Newark, N. J., to Detroit, where it occupies the eighth floor of the Trussed Concrete Building. Peter S. Steenstrup is general sales manager. The company's flexible roller bearings are being used in over 45,000 automobiles, and it has closed contracts for its bearings for approximately 80,000 automobiles for 1910.

The Frank B. Gilbreth Company, New York, has moved to new and larger quarters at 60 Broadway, occupying half a floor in the Knickerbocker Trust Company's new building, at Broadway, Exchange place and New street.

Cincinnati Machinery Market.

CINCINNATI, OHIO, June 8, 1909.

There is a little better tone to the machinery market this week, and although business has been somewhat unevenly placed and some tool concerns are still carrying promising inquiries which they are not yet able to turn into orders, the improvement is generally recognized. In shapers and milling machines particularly the movement has been satisfactory.

Nearly all tool manufacturing plants in this field are steadily adding skilled labor and some are running full time—55 hr. Manufacturers of high class specialties in the machinery and appliance line are making the greatest strides in an improvement way. All concerns making shop equipment are awaiting with no little interest the end of June and the beginning of the year's second half, which will mark the beginning of another fiscal year for the railroads, and what is hoped the placing of some large orders for much needed machinery and supplies.

In the list of concerns manufacturing specialties and appliances which have especially prospered the past week the Lunkenheimer Company, manufacturing a large line of valves, brass and iron specialties, should have a place at the head. This company received orders from the Government for goods to be used on the Panama Canal amounting to $50,000. The greater part of this order calls for high pressure valves, and $28,000 worth were ordered outright; 25 per cent. is under orders for immediate shipment. Under the Government system of purchase there is a possible enlargement of the recorded order of 50 per cent., and all specifications, therefore, are subject to further demands. The Lunkenheimer Company's plant in North Fairmount is now running 90 per cent. of capacity.

On Saturday, June 5, the Queen City Supply Company formally took over the stock and business of the Cincinnati Mill & Mine Supply Company and invoicing is now in progress. The latter has been a factor in the supply business of this section for nearly a decade, in the line of supplies and machinery for railroads, mills, mines and quarries. President and Treasurer Arthur E. Jones will now devote his entire time and energies to the other business of which he is also president and treasurer—viz., the Cincinnati Metal Company, located at 602 Walnut street. The Cincinnati Metal Company makes a specialty of babbitt and type metals.

The large foundry of the Peck-Williamson Company, Cincinnati, located at Wellston, Ohio, is shut down this week pending the readjustment of some difficulties brought on through efforts to unionize the institution. Secretary W. C. Williamson of the company says: "We have no difficulties with our men and there is nothing to arbitrate. We will treat with them as individuals, and there appear to be no grievances. It is simply an effort to change the conditions under which we have been operating, from an open to a closed shop, and entirely through outsiders." About 100 molders were employed at the time of the shutdown.

The Monarch Tool Company, manufacturing small dieing and stamping tools, &c., in the Murdock Building, has been incorporated, with a capital stock of $10,000, by Otto Creutz, Walter Bohrer, G. W. H. Bohrer, L. M. Hall and Fred E. Hoffman. Mr. Creutz is the head of the Creutz Plating Company.

The Samuel C. Tatum Company celebrates its fiftieth anniversary June 10 by an inspection of its new plant on Colerain avenue. Handsome invitations have been sent out bearing a half-tone view of the plant. The company, under the direction of President Samuel C. Hilles, is preparing an appropriate history of the business, which was established in 1859 on Water street, Cincinnati.

The Bass Foundry & Machine Company, Ft. Wayne, Ind., has five of its seven cupolas in operation, and the statement is made that business is improving to such an extent as to warrant the continuance of these, with possibility of putting the remaining two in operation at a comparatively early date.

Secretary Allen W. Williams of the Central Stove Manufacturers' Association, with headquarters at Columbus, Ohio, has announced that the quarterly meeting would be held at the Chittenden Hotel, that city, June 16. A large attendance is expected.

The Buckeye Steel Castings Company, Columbus, Ohio, is again operating three of its five furnaces, and notes a distinct improvement in the railway equipment business.

The Shaw-Kendall Engineering Company, Toledo, Ohio, has purchased ground adjoining its plant, 50 x 200 ft., and will erect an additional building.

S. F. Bowser & Co., Ft. Wayne, Ind., have planned some improvements at their plant on the south side, to cost approximately $60,000. These include the installation of three 120-hp. gas engines, with compressors attached, already purchased, and necessary equipment for an addition to the boiler shop, which will be of brick, one story, 80 x 160 ft. General Manager Polhamus considers the business outlook good and believes it warrants the outlay the company will make in the improvements, which will facilitate the work of building large oil tanks.

Ferdinand Meier, structural iron contractor, Ft. Wayne, Ind., is building an additional structure to provide larger facilities.

J. G. Oberhelman, a prominent Cincinnati foundryman, will erect a complete foundry building on property recently purchased at Spring Grove avenue and Arlington street, in the new Camp Washington factory district.

Chicago Machinery Market.

CHICAGO, ILL., June 8, 1909.

Positive improvement is noted in nearly all branches of the machinery trade. So far as machine tools are concerned, if the railroads and related industries were buying as freely as they did in 1906-1907, the volume of business would now be but little, if any, short of what it was in those prosperous years. Reports from the leading machine tool houses indicate not only a wider range of inquiries but a continued increase in actual sales. One of the most encouraging features observed is the renewed interest of the larger manufacturing concerns as manifested in recent purchases of considerable size and more frequent inquiries covering prospective requirements. A few houses, who were successful in securing some of the larger equipment orders placed last month, actually booked more business in that time than for any like period in their history. While significant of a remarkable degree of improvement, these results do not, of course, afford a fair criterion of the general average. At the same time it goes to show that the underlying current of demand is steadily rising—a fact that is further attested by the general experience of the trade. In forecasting future developments it seems only fair to assume that the heavy tonnage of steel bars, plates and shapes recently placed with the mills will in many cases necessitate the purchase of new machinery. Looked at from almost any point of view, the situation at present affords little room for pessimistic doubt.

Among the delegates and visitors in attendance at the fifth annual convention of the International Railway Foremen's Association held in Chicago last week there were many practical shop men interested in machine tools. Quite a number of these found time to visit the various machine tool houses upon tours of inspection. The practical value of demonstration shops in connection with machine tool houses was strikingly illustrated upon this occasion by the critical interest displayed by these visitors in the tools operated in the demonstrations of the Marshall & Huschart Machinery Company and Hill, Clarke & Co. Among the tools practically demonstrated in the Marshall & Huschart Machinery Company's shop were a 20-in. patent head Lodge & Shipley lathe, equipped with multiple length feed stops especially adapted for the execution of multiple work; Landis bolt cutter, which reduces stock and chases the thread in one operation; Bullard 24-in. rapid production vertical turret lathe with swivel turret head and fixed side head; No. 3 vertical high power Cincinnati miller; No. 4 plain double back geared milling machine, and Marvel draw cut hack saw No. 2. Among the 25 tools connected up with belt and motor drives in Hill, Clarke & Co.'s shop were a 32-in. Flather vertical boring mill, Flather gear cutter, Thompson universal grinder, Cochrane auto saw sharpening machine, Cochrane new No. 6 cold saw and 18 in. by 8 ft. geared head single pulley drive Whitcomb-Blaisdell lathe.

The Puget Sound Machinery Depot, Seattle, Wash., is in the market for approximately the following iron working machinery for the equipment of a new shop: 72-in. vertical boring mill, two heads; 36-in. triple geared lathe, 25-ft. centers; 24-in. heavy geared lathe, 15-ft. centers; 18-in. quick change lathe, 10-ft. centers; 24-in. turret lathe; 48 in. by 14 ft. planer, two heads, open side; 24-in. heavy shaper; 48-in. radial universal drill; 24-in. drill press; 20-in. drill press; No. 3 Mitts & Merrill or equal key seater; shaft key seating machine; pulley lathe, capacity 12 to 36 in.; shaft centering machine and power hack saw.

The wonderful expansion of the automobile business is reflected in the continued increase of manufacturing capacity in the building of new plants and enlargement of old ones. Among recent improvements of note in this line are those now being made to the Rambler factory of Thomas B. Jeffery & Co., Kenosha, Wis. Additional buildings under construction and in contemplation by the firm will within the next two months add 186,256 sq. ft. of floor space to the plant, which will give a total of floor area of nearly 800,000 sq. ft. The one-story steel concrete saw tooth roof construction characteristic of the present plant buildings will be followed in the new buildings to be added. It is to such enterprising growth that the machine tool trade owes a large share of the support given it during the past two years.

The Walcott & Wood Machine Tool Company, Jackson, Mich., has just completed and is now occupying a new one-story factory building, 70 x 155 ft. The old factory is being utilized as a storage and shipping room. The company reports business for the past six months as being very good, with a bright outlook for even better trade in the future.

The proposition of a bond issue for $37,500, to be used for the construction of an electric light and water works system, will be voted on June 18 by the city of St. John, Kan. Plans for this improvement have been prepared by Burns & McDonnell, engineers, Kansas City, Mo.

John W. Early, Columbus, Neb., having secured a fran-

chise for electric light and power service from the city of Broken Bow, Neb., will purchase new equipment for this installation, which will consist, in part, of a direct connected four-valve or belted Corliss engine of 150 hp., with a generator of 100 kw., 2300 volt, three phase.

Pursuant of plans for consolidation of the Boone Gas Company, Boone Suburban Railway and the Central Heating plant, E. G. Pratt, president of the former company, is seeking a suitable franchise from the city covering these utilities. Improvements in contemplation in connection with this work involve an expenditure of about $200,000.

The Huron Electric Company, Huron, S. D., has sold its plant to the Huron Light & Power Company of that place, which proposes to enlarge the plant by the installation of producer gas power equipment.

A second steam turbine, jet condenser, electric generator, exciter, &c., will be installed in June or July by the Western United Gas & Electric Company, Aurora, Ill.

A hoisting engine and accessory machinery will probably be placed this fall in the power plant of the Senator Mining & Milling Company's mines. Headquarters are at Spokane, Wash.

The Carthage Coal Company, Carthage, N. M., is having plans prepared for a central power station from which to supply electric current to its own and surrounding properties.

The California Lock & Hardware Company, Los Angeles, Cal., whose foundry is at Riverside, Cal., where two manufacturing buildings, 60 x 200 ft., and an office building, 20 x 40 ft., have been erected, will be in the market for turret lathes, tapping machines, heavy punch press and small tools. The company has absorbed the Pacific Malleable Casting Company and the Western Lock & Hardware Company of Los Angeles.

The American Automatic Stoker Company, in which Edwin Hawley of New York is interested, and D. W. Ross, 165 Broadway, New York, is president, is looking for a site for a plant and is negotiating with the Business Men's Association of Bloomington, Ill., to that end. The company was organized some time ago to manufacture the Strouse stoker, which has been adopted as a locomotive stoker on a number of railroads. The company is now having its product made by outside parties and it has been so successful that the financial backers have decided to build a plant. Just how large a plant will be erected has not been decided as yet and other than that the plant will be located somewhere in the West. The company's plans are entirely tentative. J. J. Hannahan, who has offices at 213 Railway Exchange Building, Chicago, is the general manager of the company and he is authority for the statement that if agreeable terms are offered by the Business Men's Association of Bloomington a plant will be erected there. This action will call for a considerable expenditure in the way of foundry, power and machine shop equipment.

Cleveland Machinery Market.

CLEVELAND, OHIO, June 8, 1909.

The volume of business as reported by the machine tool houses showed some falling off the past week as compared with similar periods in May. Some of the dealers explain the slump by the fact that a large number of manufacturing concerns close their fiscal year with June and are inclined to put off until next month the purchase of additional equipment unless it is needed for immediate use. Locally the manufacturers have been devoting considerable time and attention the past two or three weeks in making preparations for the exhibits at the Cleveland Industrial Exposition, which was formally opened last evening, and will continue for two weeks. There are 283 exhibits, and of these a large share are by manufacturers engaged in metal working lines.

Sales during the week were mostly of single tools. Inquiries are not numerous and none of any size has come out. The demand for second-hand tools is less active than it has been for several weeks.

Builders of machinery, as a rule, report the situation as encouraging and a gradual improvement in business. In heavy machinery there is more demand for coal handling plants. Orders for locomotive cranes show a marked improvement, orders coming almost altogether from industrial plants. Builders of small motors and generators report a better volume of orders than for some time. The railroad situation remains unchanged, practically no orders coming from that source.

The Allyne Brass Foundry Company has commenced the erection of an addition to its plant in Cleveland that will practically double its capacity. The new building will be 70 x 320 ft., of fireproof construction. The company is also preparing plans for the building of large additions to its foundries in Buffalo and Detroit that will also double the capacity of those plants. Work on these additions will be started soon. It will be in the market soon for the foundry equipment for the new additions. The company is an extensive manufacturer of automobile parts and its plants are now being rushed at their fullest capacity with that class of work.

The Erie Wheel Company, Cleveland, has been organized to manufacture sheet steel wheels for baby carriages, go-carts, express wagons, hand cultivators, wheel barrows, &c. Later it is the intention to make heavier wheels for agricultural purposes. The company for the present will manufacture its wheels in the plant of the Erie Stamping & Mfg. Company, Erie, Pa., but expects to build a plant of its own in Erie within a year. It is capitalized at $25,000, but this will be increased to $100,000. The officers are: President and treasurer, J. A. Carter, formerly of the American Fork & Hoe Company; vice-president, A. A. Thompson, president of the Erie Stamping & Mfg. Company; secretary, W. R. Brown, formerly with the Novelty Advertising Company, Coshocton, Ohio. The offices are located at 616 Citizens' Building, Cleveland.

The Brown Hoisting Machinery Company, Cleveland, reports a decided improvement in the demand for locomotive cranes, having recently received a number of orders from industrial plants in this country, Mexico and Canada. In other lines the company reports some improvement in orders. Among new contracts taken are the following: Coal plant for the Providence (R. I.) Gas Company, bridge and pig iron breaker for the new blast furnace being built by the Detroit Iron & Steel Company, and a pig iron breaker for the Hubbard furnace that is being rebuilt by the Andrews & Hitchcock Company.

The Timken Detroit Axle Company, with a capitalization of $1,000,000, has been incorporated in Ohio by the Timken interests in Canton, Ohio, to operate an automobile axle plant in Detroit, Mich. Buildings and equipment for the Detroit plant were recently purchased, and the plant is now being placed in operation. The Timken Roller Bearing Axle Company of Canton will operate its plant as usual, but its output will be confined to roller bearings.

The Upson Nut Company, Cleveland, has awarded the contract for a new ore bridge at its blast furnace to the Wellman-Seaver-Morgan Company, Cleveland, and the contract for ore bins and trestle to the Variety Iron & Steel Works Company, Cleveland.

The Snyder Electric Nut Mfg. Company, Canal Dover, Ohio, was recently reorganized and its name changed to the Dover Electric Mfg. Company. The latter company has increased its capital stock from $25,000 to $50,000 in order to provide for the extension of its business. F. H. Waldron is president and H. H. Harrold, manager.

The Macbeth Iron Company, engineer, founder and machinist and builder of blowing engines, &c., and the Bruce-Meriam-Abbott Company, builder of gas engines, both of Cleveland, Ohio, have been consolidated under the name of the Bruce-Macbeth Engine Company. It is the intention of the new company to continue the business of both of the former companies on a much larger scale than heretofore and to concentrate the two plants in the former plant of the Macbeth Iron Company on Center street, N. W. Alterations to the present buildings are to be made and several new buildings will be erected to accommodate the enlarged business, the combined equipment of the two companies making a complete and modern shop. Both of the companies have been long established in Cleveland, and their consolidation makes one of the largest and strongest companies of its kind. The Macbeth Iron Company was established in 1870 and was known until late years as Macbeth & Co. The Meriam-Abbott Company, predecessor of the Bruce-Meriam-Abbott Company, was organized in 1900 and was one of the pioneers in the manufacture of the commercial gas engine and its development to the present standard of perfection. The officers of the new company are: President, W. C. Bruce, formerly president of the Bruce-Meriam-Abbott Company; vice-president, C. W. Kelley; secretary and treasurer, C. J. Snow; manager, C. E. Curtiss, the latter three retaining the same positions as they formerly held in the Macbeth Iron Company. The officers and A. D. Macbeth, J. B. Meriam and F. B. Abbott constitute the Board of Directors.

Milwaukee Machinery Market.

MILWAUKEE, WIS., June 8, 1909.

The increasing demand for machinery to be installed in mines, smelters and ore milling plants is lending material support to the manufacturers of this section. Not only the two large concerns at West Allis and Cudahy, which make a specialty of supplying complete equipments of this character, but also individual builders of engines, blowers, pumps, electrical apparatus, crushers, screens, perforated metal, magnetic separators, elevating, conveying and power transmitting machinery, belting, rubber goods, steam shovels, dredges, hydraulic machinery, piping, valves, air compressors, drills, drill sharpeners, cutters, saws and tools used in mine tim-

bering, hoists, skips, larries, dump cars, buckets, wire rope, cages, hauls, washing plants, chemicals, &c., are feeling the effect of the renewed buying from this source, which comes from many parts of the world.

Analagous to this is the revival of a large number of hydro-electric developments which were projected two years or more ago, but have lain dormant during the interval because of the withdrawal of capital. Many such are now being actively taken up again, and on some of them construction work has already begun. Others that were partially completed, but upon which operations were suspended during the worst part of the depression, have now reached the stage where contracts for the machinery have to be let, and manufacturers are busily engaged upon estimates and plans, as well as upon orders recently entered. Competition is becoming less and less sharp, especially in machinery for hydraulic power plants. In Wisconsin, where the authorities at the Capitol have been particularly active in pointing out the possibilities of as yet undeveloped water powers, there is such a scrambling after dam rights that the State has found it necessary of late to adopt rather stringent methods of regulating future concessions. This naturally strengthens in the eyes of investors the desirability of developing power sites already secured, and the present activity in that respect is marked. Thus far local machinery builders have skimmed the cream of this business, and there seems to be a disposition on the part of outside manufacturers to leave the field quite largely to them.

Work on the Southern Wyoming Power Company's hydraulic power development, which will be one of the largest of its kind in the West, has been started near Laramie, Wyo.

The capacity of the Northern Idaho & Montana Power Company's plant at Sand Point, Idaho, will be increased to 1000 kw. and further extended as the commercial load develops. Contract for a 500-kw. generator and engine has already been placed.

A new electric generating unit has been decided upon for the municipal light plant at Shakopee, Minn.

From Hazelton, Iowa, it is reported that a reinforced concrete shop building, 36 x 200 ft., will be erected for the Sherman & Smith Engine Company.

The Watertown Gas & Electric Company, Watertown, Wis., will build a concrete dam and erect a power house 38 x 94 ft. The machinery to be installed includes one or two hydraulic turbines and generators, two 1500-kw. motor generator sets, one 500-kw. balancer and eight power transformers, ranging in size from 300 to 2000 kw. each.

It is reported that a brick foundry building will be constructed at 241 Lake street, Milwaukee, for P. J. Rice.

The Grand Rapids Stove Company, Grand Rapids, Mich., has let contracts for a new building, 55 x 408 ft., the machinery in which is to be electrically operated.

In the Menasha Paper Company's new mill near Ladysmith, Wis., it is intended to install a Corliss engine of 250 hp. and two steam boilers of 200 hp. each, as well as transmission and sulphite mill machinery, including three digesters.

Negotiations are in progress for the location of an automobile factory at Sparta, Wis.

Plans for the large addition to the plant of the Geuder, Paeschke & Frey Company, Milwaukee, are practically completed, and bids on building and machinery equipment will be taken in the near future.

It is reported that the Heron Lake Brick & Tile Company, Heron Lake, Minn., will build an addition to its plant this fall and install a Corliss engine of larger capacity than the machine now in service.

The Caloric Company, Janesville, Wis., is putting up a new factory building, 50 x 136 ft.

The Mesaba Iron Works, Virginia, Minn., has commenced work upon a group of new buildings, including a foundry, forging room and machine shop.

An hydro-electric power plant is to be built near Mackay, Idaho, by the Mackay Light & Power Company, recently organized. The initial machinery is to include a 500-kw. water wheel and generator.

New England Machinery Market.

BOSTON, MASS., June 8, 1909.

Business is keeping up among the dealers, to whom it has become evident that the stimulus to demand which was first felt strongly a month ago is nothing transient, but rather destined to continue, with probably some little interruption during the hot weather. Active inquiries are numerous, mostly for small lots, to be sure, but nevertheless of satisfactory volume. Most of the machipery builders find a continuance of improved business, though there is still room for a good deal of improvement in standard lathes, drills, planers and shapers. The automobile trade remains the most important buyer, additions to equipment being made without interruption in a manner far exceeding the most sanguine expectations of the trade. Many of the automobile factories are now producing parts for their 1910 models and will begin assembling soon, with a promise of having them on the market within two months. The demand for cars is so great that it is expected a great number of the new cars will be marketed this season, which will mean a still greater effort on the part of the builders to get together a stock sufficient to meet the expected buying for next season's delivery. This will reflect its benefits upon the machine tool trade, for it will tend to compel a constant increase in manufacturing facilities. The New England railroads are doing little buying. The Boston & Maine is yet to announce the details of its new repair shops to be built at Somerville, Mass., and no word has been given out by the New York, New Haven & Hartford as to new shops in western Connecticut. The American Steel & Wire Company has out inquiries for a few new machines.

The Automatic Machine Company, Bridgeport, Conn., manufacturer of machine tools, special machinery and combustion engines, has practically completed the absorption of the Pacific Iron Works of that city, and will occupy the large plant in the near future. The works will be modernized wherever it is necessary. A new erecting shop will replace small wooden structures, and will be about 120 x 150 ft., one story, with saw tooth roof. The machine shop will be given larger windows and new floors. The foundry is modern, and has the necessary appliances for high-grade work. The erecting shop will be equipped with traveling cranes, and every means will be provided for economical manufacture. Some new machine tools will be added later, according to present plans. The Pacific Iron Works will remain in existence as a corporation for the present, arrangements having been made between the two companies so that the present tenants will have occupancy under a lease, but the ultimate intention is to merge the corporation into the Automatic Machine Company. The owners of the Pacific Iron Works, Henry A. Bishop, recently purchasing agent for the New York, New Haven & Hartford Railroad, and William E. Burnham, formerly of the Eaton, Cole & Burnham Company, have been added to the Board of Directors of the Automatic Machine Company. This company was recently reorganized and reincorporated under Connecticut laws, with F. J. Kingsbury, Jr., as president; James Coulter, vice-president and superintendent; Norman Leeds, treasurer and general manager, and Stiles E. Goodsell, secretary, with William R. Webster, general superintendent of the Bridgeport Brass Company, as the fifth director, the board now being increased to seven. The business has grown rapidly, until the present building has been completely outgrown, and there is no opportunity for increased manufacturing space on the site. The plan is to sell this real estate. The Pacific Iron Works is one of the oldest industries of Bridgeport. It manufactures special machinery and castings. The new owner will now be able to make its own castings, which have hitherto been furnished by outside foundries.

The incorporation of the Dwight Slate Machine Company, Hartford, Conn., under the laws of Connecticut, indicates that the old business of the name will be continued. Samuel E. Elmore is the president of the new company, Charles B. Elmore vice-president and secretary, and Martin Welles treasurer, all of Hartford. The authorized capital stock is $50,000. Leslie Moulthrop, New Haven, Conn., the receiver of the business, has received permission from the court to sell the property, so that it is presumed the new corporation has but to carry out the necessary formalities in order to acquire the business. The Dwight Slate Machine Company manufactures sensitive drill presses, automatic gear cutters and marking machines.

It is believed in Hartford that the business of the Electric Vehicle Company will be continued by a new corporation, which will be organized as soon as the necessary preliminaries are completed, including permission by the courts to dispose of the business to the Reorganization Committee, who will organize a new corporation for the management of the industry.

A transaction, which means the ultimate development of a large water power, is the taking over by the Union Water Power Company, Lewiston, Maine, of all the privileges on the Androscoggin River for a distance of 6 miles, an equivalent of about 10,000 hp. Concrete dams will be erected, and the power developed at a large electric station. These rights were owned by the International Paper Company, which retains certain of its privileges, which will be employed, it is said, to create electric power for the development of industries at Livermore Falls, Maine. The Union Water Power Company will carry its power to Lewiston, where it will be used largely in the cotton manufacturing industry.

The Narragansett Electric Lighting Company, Providence, R. I., will install a 3500-kw. turbine set, replacing a reciprocating engine of the Corliss type. A turbine of the same size has been tried out at the plant, and has given such satisfaction that increases in power will hereafter be in duplicating these units.

It is given out in Worcester, Mass., that the factory of the Vocalion Organ Company will be moved from that city to Meriden, Conn., the purpose of its owner, the Æolian Organ Company, New York, being to concentrate its business in the Connecticut city. The Weber Piano Company,

owned by the same company, will remain in Worcester for a while, but the plan is to move it also to Meriden.

The Safety Door Check Company is a new corporation which has established a factory at Indian Orchard, Mass. It will manufacture a safety door check, the invention of John W. Superneaw. James J. Griffin is the president; John W. Superneaw, treasurer; A. P. Brouliette, vice-president, and Edwin F. Perkins, secretary. The factory will be on Berkshire street.

The American Novelty Company, 185 State street, Bridgeport, Conn., has been incorporated to manufacture metal novelties. Samuel Cohen is president; Samuel Silverstone, vice-president, and Louis Silverstone, secretary and treasurer.

Among the week's announcements of enlargements of manufacturing plants are the following: Gold & Weinberg, New Haven, Conn., carriage builders, factory, 48 x 50 ft., three stories; American Paper Goods Company, Kensington, Conn., three-story factory, 42 x 150 ft.; White & Bagley Company, Worcester, Mass., lubricating oils, six-story concrete building; Estabrook-Anderson Shoe Company, Nashua, N. H., four-story building, 500 ft. long, the plans having been changed for this greatly increased space; Elizabeth Mill Company, Hills Grove, R. I., textiles, three-story addition, 74 ft. long; Ætna Mills, Waltham, Mass., textiles, three-story mill, 50 x 120 ft.; Fisher Mfg. Company, Fisherville, Mass., textiles, four-story addition.

Philadelphia Machinery Market.

PHILADELPHIA, PA., June 8, 1909.

A moderate volume of business has been transacted in some lines; the market, on the whole, however, is rather narrow and in instances drags perceptibly. Few really large propositions, that have the appearance of business in the near future, are before the trade, the bulk of the actual orders placed recently being small, mostly for single tools, with occasional orders of somewhat better size. The trade, however, has quite optimistic views regarding the future; general business is evidently on a higher level, the railroads are handling a larger volume of business and a decrease in the number of idle freight cars is reported. More buying of railroad equipment is to be noted, although there has been nothing of importance in the way of machine tools. Increased activity in the iron and steel trades is looked upon with encouragement, and it is believed that a decidedly more active market will develop in the early fall.

While the orders taken recently show a material increase over those taken at this time last year, the variety of tools sold has been wide, and few manufacturers in this territory have received any large volume of business. The gains, therefore, have not been so extensive individually as might be expected, and some plants have not yet exceeded the 50 per cent. production mark very greatly. Textile machinery builders have been the most active, as there has been a comparatively strong demand for equipment of that class for some time. The smaller manufacturers of special machinery are quite busy; a number are running full time and have considerable work ahead. Builders of the heavier type of tools, of a standard or special type, have, as a rule, showed the least improvement. Locomotive builders are a trifle better off, while heavy engine builders also report a slight betterment. Milling machines still lead the demand. Drilling machines of various types and lathes of the small and medium sizes have also been fairly active. Special tools show some irregularity, particularly those of the heavier types.

The foreign demand remains quiet. Little has developed in the usual standard types of tools, although there has been some scattered business in special tools. The transmission equipment trade continues fairly active, although individual orders are small.

The demand for second-hand machine tools has been rather spotty, and business is largely of a day to day character, covering a varied class of equipment. Second-hand boilers and engines have been in moderate demand, although a good volume of business for new equipment, both moderate and of fairly good size, is before the trade.

No developments of importance are to be noted in the foundry trade. A fair volume of business of a varied character comes out, while many of the iron and steel casting plants show an increase in the volume of orders and are consequently melting more iron. There is still plenty of room for improvement. On the whole, however, the situation is better than it was, and the trade looks for a continuation of the recent moderate betterment.

The Pennsylvania Warehousing & Cold Storage Company has had plans prepared and is taking estimates for a plant estimated to cost $400,000, to be erected at Front, Noble and Beach streets. Plans provide for an eight-story brick and concrete building, 150 x 175 ft., and a two-story power plant, 50 x 92 ft.

It is understood that bids will be received until early in July for the construction of a water works for Bethlehem, Pa. Information may be obtained from W. J. Frick, secretary of the City Council. R. E. Neumeyer is the borough engineer.

The Cunningham Piano Company, Fiftieth street and Parkside avenue, has let contracts for an addition to its plant comprising 25,000 sq. ft. of floor space. Work on the extension will be started the coming week.

The engineering department of the Pennsylvania Railroad has, it is understood, plans in course of preparation for a new pier and ferryhouse, to be erected at Vine street wharf, on the Delaware River.

Action by councils of Camden, N. J., on the ordinance granting the necessary privilege in connection with the proposed tunnel under the Delaware River, between Philadelphia and Camden, has again been deferred. A new form of ordinance has been offered by those interested in the project, action upon which will not be taken, it is said, until June 30.

John H. Windrim, architect, has prepared plans and invited estimates for the erection of a one-story and basement building, 23 x 106 ft., as an addition to the foundry and shop building of Girard College.

Government Purchases.

WASHINGTON, D. C., June 8, 1909.

The Isthmian Canal Commission will soon ask bids for a piston air drill, hydraulic screw punch, air drill motor, and other supplies.

The Isthmian Canal Commission will receive bids until July 19, Circular No. 516, for machinery for a central pumping station and three pumping units for hydraulic excavating and sluicing, including pumps, motors, engines, boilers, monitors, pipe and fittings, &c.

The following bids were opened June 1 for machinery for the navy yards:

Class 2.—One locomotive type boiler—Bidder 43, D'Oller Engineering Company, Philadelphia, Pa., $2596 and $2020; 64, A. D. Granger Company, New York, $2848 and $2222; 82, E. Keeler Company, Williamsport, Pa., $2449 and $2032; 122, Oil City Boiler Works, Oil City, Pa., $2166.

Bids were opened at the office of the Isthmian Canal Commission May 29 for 1 portable rock crusher, with elevator, portable bin and revolving screen, as follows:

Acme Road Machinery Company, Frankfort, N. Y., $1186.09, $1334.94, $982.12 and $1124.54; Allis-Chalmers Company, Milwaukee, Wis., $2200; American Road Machinery Company, New York, $1353.75; Austin Mfg. Company, Chicago, Ill., $1742; Climax Road Machine Company, New York, $1463.25; Indiana Road Machine Company, New York, $1479.60; Manning, Maxwell & Moore, New York, $1350 and $1600.50; T. L. Smith, Chicago, Ill., $1620.

George B. Carpenter & Co., Chicago, Ill., have been awarded contract for four Yale & Towne triplex 6-ton hoists for Jeffersonville, Ind., bids for which were opened May 26.

Under bids opened May 18 for machinery for the navy yards, the Davis-Bourneville Company, New York, has been awarded class 501, one oxy-acetylene welding and cutting plant, $4970.

The following awards have been made for machinery for the Isthmian Canal Commission, bids for which were opened May 24, Circular No. 508:

American Hoist & Derrick Company, St. Paul, Minn., class 1, two 20-ton locomotive coaling cranes, $13,316.

Henry R. Worthington, New York, class 4, six duplex boiler feed pumps, $1245.96.

Fox Brothers & Co., New York, class 5, one combination hand and power pipe threading machine, $246.69.

Bentel & Margedant Company, Hamilton, Ohio, class 6, one rip saw, $400; class 7, one automatic cut-off machine, $450; class 9, one post boring machine, $110.

Tucker Tool & Machine Company, New York, class 8, one band saw, $61.

Manning, Maxwell & Moore, New York, class 10, one planer, $135; class 12, one jointer, $125.

Cleveland Pneumatic Tool Company, Cleveland, Ohio, class 11, two reversible wood boring machines, $178.

The Myers Motor Company, Robinson, Ill., incorporated with a capital stock of $60,000, has been organized for the purpose of developing the Myers current motor. This motor is described as a new and ingenious form of water wheel designed to utilize the force of running water in rivers and streams for power purposes. It is said to be adapted to shallow or deep streams, fast or slow currents, and to large or small volumes of water, being, in fact, applicable to all the conditions usually found in running streams. Chas. E. Mann is president; Geo. N. Parker, vice-president; Hon. J. B. Crowley, secretary; L. H. Brigham, treasurer.

A large mechanically stirred furnace of the Klepetko type, for roasting ore, has been ordered from American builders by the Metals Extraction Company, London, England.

HARDWARE

THE most important change in freight rates that has taken place in the United States in many years is now under way in the western part of the country, especially in the territory between the Missouri River and the Pacific Coast. The San Francisco earthquake held the attention of the world for many months, yet its commercial significance was scarcely equal to this readjustment of freight tariffs which has attracted but little public attention. The geography of commerce rests upon freight rates, and from a business point of view the Interstate Commerce Commission, the transcontinental railroads and the shipping interests of Western cities are now engaged in work equivalent to pulling down the Rocky Mountains.

Two months ago the Interstate Commerce Commission ordered a drastic reduction, reported in *The Iron Age* at the time, in rates on 32 commodities from Chicago and St. Paul to Spokane. The railroads have accepted this epoch making reduction without any contest in the courts, and it has now gone into effect, excepting that the Commission has relieved the Union Pacific lines from the necessity of complying with the order. The rates from territory east of Chicago to Spokane and other transcontinental points have always been the same as from Chicago, but the order of the Commission did not require any reduction from Eastern points, and the railroads naturally have not gone beyond the specific reductions ordered. Eastern shippers will, therefore, have to pay Chicago rates, plus the "local" from the East to Chicago.

Growing out of the Spokane case, there is a hearing at Washington this week, at which Spokane, Seattle and other cities will be represented, to determine how much farther the Commission shall go in applying the rules laid down in the Spokane case to rates on other commodities, and from Eastern points to other cities. The complaint on which the Spokane case was decided only specified 32 commodities, and the Commission has no legal power to decide any rate question excepting within the limits of the complaint before it. The Commission, however, called upon the railroads involved to compile new tariffs, covering all traffic to Spokane, and submit these new tariffs before May 20. This has been done, and the hearing this week is to consider what action shall be taken on this general readjustment. If there are no objections the Commission will authorize the railroads to put the new rates into effect July 1, on less than the statutory 30 days' notice. It is unnecessary to say that there will be strenuous and formal objections from other cities, which will delay any immediate action.

Meantime, the Commission has given the railroads to understand that rates to Salt Lake and other "inter-mountain" cities must be reduced. Salt Lake shippers recently presented a formidable petition to the President demanding the prosecution of the transcontinental railroads under the Sherman law for conspiring together to maintain rates in restraint of trade. This petition was referred to the Interstate Commerce Commission, which advised the petitioners to present a modified document, making a specific complaint under the Hepburn law. Complaints are also filed or in contemplation by shipping interests of coast cities, demanding lower rates eastbound to "inter-mountain" territory.

Another confusing angle of the general problem is found in the Denver case. The Commission ordered a sharp reduction in rates from Chicago and St. Louis to Denver, effective from all Eastern points, but eight of the "Granger" railroads have obtained an injunction in the federal court at Chicago, and the reduced rates will not become legal until they have been sustained by the courts. In line with the suggestion that the reductions to points farther west will have the commercial effect of leveling the Rocky Mountains, the contesting roads in the Denver case specifically declare that the order of the Commission will have the effect of "destroying the Missouri River" as a basing point for rates to territory west of it. They claim that the cities on the Missouri and the Mississippi had become established as jobbing centers, and vested trade interests had grown up, before the railroads came, and that in making them basing points the carriers merely recognized pre-existing conditions. In this and the Kansas City case the courts will have full opportunity to thrash out the conflicting views of the Commission and the traffic managers of the railroads. The Commission in both cases has acted on its theory that through rates should be lower than the sum of the locals on account of the saving in terminal expenses.

A question in the background that has not yet been considered in this tangle is the practice of the Transcontinental lines in making "commodity" rates on less than carloads to the Pacific Coast. In the Spokane case only carload rates are involved, as Spokane and other interior cities have not been allowed L. C. L. commodity tariffs. The Pacific railroads have shown a willingness to accept whatever terms the Commission may impose, as this policy is in harmony with their far reaching plans for minimizing the competition of the Panama Canal and the Tehuantepec route. The contest in its sharpest angles is to be between rival cities for possession of jobbing territory, and it is likely to be drawn out for many years before it is settled. Meanwhile, the course of things will be watched with closest attention by the commercial classes in all parts of the country, inasmuch as principles similar to those involved in this Western territory apply more or less directly to transportation matters in other sections.

Condition of Trade.

The near approach of the harvest season, without the development of any general conditions unfavorable to the maturing and gathering of good crops, furnishes a basis for confidence in business circles. There is accordingly a more or less definitely defined impression that the quite noticeable improvement which has already taken place in trade, both in feeling and in volume, will become more pronounced as soon as the promise of good harvests is realized. If there should be a disappointment in these expectations owing to injurious weather conditions there would need to be a revision of the hopeful anticipations which the trade are now entertaining. The outlook, for-

tunately, is promising and there is no ground for gloomy forebodings. In the Hardware market there is little change in the general situation since our last report. The volume of business is by some reported lighter than a week or two ago, when good orders were placed pretty liberally, as the merchants deemed it advisable to cover their requirements for the near future, and in a few cases to buy with old-time freedom for early needs. This activity, which came as a very pleasant increase in the volume of current trade and as an indication of a better condition of things, is naturally followed by a less urgent demand for the lines thus covered, and the market is accordingly a little quieter than a week or two ago. There are, however, certain lines in which there is more doing. The situation as regards prices is somewhat perplexing, and calls for special care and knowledge on the part of buyers. In some directions there is a hardening tendency in prices, sometimes developing into actual advances, but without any important general movement upward. In other lines the weakness and uncertainty which have prevailed for some time still continue with a marked desire on the part of manufacturers to book orders, and a readiness to make special prices on definite specifications for good quantities. The general run of Hardware, however, remains at about the level at which it has been selling for some time. Reports from the merchants throughout the country are in general satisfactory, and there is a good degree of activity with the ultimate distributors. The large amount of building which is going on is an important and encouraging feature of the situation.

Chicago.

The buying movement in Wire and Wire products, which was the feature of overshadowing interest in May, has spent its force and the market is drifting into the less strenuous zone of summer influences. Seasonable conditions impose upon the market certain limitations which to a greater or less extent are always operative in their successive order. Thus June is normally a quiet month and the most that is expected this year is that it shall show relative improvement. From the present outlook there is every reason to believe that this expectation will not be disappointed. All lines, it is true, are not sharing the growing demand in like proportion, but there are few, indeed, which have not been favorably affected by the general upward trend of industrial developments. Instead of the constant downward incline which for nearly two years past has marked the course of prices, the indications are that the angle of movement will soon be tilted the other way. While prices thus far have but in few instances been actually advanced, it can be safely said that a feeling of greater firmness exists all along the line. Reflexively a great majority of goods handled in Hardware stocks are in some measure at least responsive to the fluctuations of value in iron and steel rolling mill products, and these have nearly all either reacted to some extent from extreme low levels or are positively stronger. Moreover, the large tonnage of rolled steel, especially of structural shapes, already entered and still accumulating on mill order books, means extended Hardware requirements from manufacturers by whom these materials will be used. Promise of a large hay crop is responsible for an active demand for hay tools. It is only within comparatively recent years that hay tools have been extensively handled by the Hardware trade. In the beginning such implements were looked upon by the farmer more as a luxury than necessity, and it was not until they had become an indispensable part of farm equipment that they were regularly included in Hardware stocks, of which to-day they are an important item. The steady advance in prices of melting scrap has forced sash weight prices up from $1 to $1.50 a ton.

NOTES ON PRICES.

Wire Nails.—New business received by mills is in excess of anticipations, as the 10-cent advance was expected to curtail demand quite effectively. While buying is not nearly as heavy as in the early part of May, it aggregates a fair volume. The general maintenance by the manufacturers of the advanced prices and the conjecture that there may be another slight advance may have something to do with the activity which is, however, to be credited principally to the good conditions prevailing throughout the country. Quotations are as follows, f.o.b. Pittsburgh, plus actual freight to point of delivery, 60 days, or 2 per cent. discount for cash in 10 days:

Carloads to jobbers	$1.70
Carload lots to retail merchants	1.75
Less than carloads to jobbers	1.75
Less than carloads to retail merchants	1.85

There is some cutting reported by the jobbers bought at the low price recently current, but in general jobbers' quotations are well maintained.

New York.—Business with nearby territory is restricted to some extent, as a result of larger retail houses which bought carloads of Nails when they were selling at $1.60, base, and are now able to supply smaller retail merchants at less than the present market would warrant. Small lots of Wire Nails at store are held at $1.90 per keg, base.

Chicago.—New buying, though light in comparison with the unprecedented rush of business in May, is heavier and continues later than was expected. The volume of such business now being entered is not far short of a normal average. Specifications are coming in freely from jobbers, some of whom are asking a revision of delivery schedules to provide earlier shipment. This would indicate that a good many small dealers, having failed to cover their requirements at the low prices, are now coming into the market. Owing to the fact that the leading mills had accumulated large stocks, which are now being drawn from, orders are being promptly executed. We quote as follows: $1.88, Chicago, in car lots to jobbers, and $1.93 in car lots to retailers, with an advance of 5 cents for less than car lots from mills.

Pittsburgh.—While the advance of 10 cents per keg in prices of Wire Nails had the expected effect of curtailing heavy demand to some extent, a fair volume of new orders is being received by the mills at the prevailing price of $1.70, indicating confidence of the trade that this price will be maintained and that possibly higher figures may prevail in the near future. All the leading Wire Nail mills have enough orders on their books to take their entire output for the next 60 days or longer, and there is some little complaint from the trade over delay in shipments by the mills. One leading Wire Nail interest is willing to take orders, accompanied with specifications, at $1.70 for delivery within the next 60 days. Prices on Wire Nails continue very firm at $1.70 per keg in carloads and larger lots, f.o.b. Pittsburgh.

Cut Nails.—Demand for small lots of Nails covering nearby requirements has increased the number of new orders and specifications received by the mills. The market still lacks strength, as concessions of 10 to 15 cents per keg are made from the regular quotation of $1.80 per keg, base, f.o.b. Pittsburgh, for carload lots. Iron Cut Nails are held at an advance of 10 cents per keg over Steel Cut Nails in the Western market, but in the East this differential is not observed.

New York.—There is comparatively little demand for Cut Nails, which are held at $1.85 to $1.90 per keg, base, for small lots at store.

Chicago.—Demand for Cut Nails continues to improve and is considerably stronger than some weeks ago. The mills are less disposed to make concessions and prices are uniformly firmer. We quote as follows: In car lots, to jobbers, Iron Cut Nails, $2; Steel Cut Nails, $1.80.

Pittsburgh.—Some improvement in new orders and specifications against contracts for Cut Nails is reported, but new orders being placed by the trade are still confined largely to small lots to cover actual needs.

There is still considerable unevenness in prices of Cut Nails, and concessions of 10 to 15 cents a keg are being made on the nominal price in force, which is $1.80, f.o.b. Pittsburgh.

Barb Wire.—The receipt of new business by the mills is diminishing as the season advances, but prices are well maintained at the recent advance quotations, which are as follows, f.o.b. Pittsburgh:

	Painted.	Gal.
Jobbers, carload lots	$1.70	$2.00
Retailers, carload lots	1.75	2.05
Retailers, less than carload lots	1.85	2.15

Chicago.—Owing to the lateness of the season in the North, there is more new buying than is ordinarily expected at this time. Heavy shipments are going forward from the mills against contracts placed at the low prices and the mills are running from 10 days to two weeks behind in deliveries. Prices are firm at the following quotations: Jobbers, Chicago, car lots, Painted, $1.88; Galvanized, $2.18; to retailers, car lots, Painted, $1.93; Galvanized, $2.23; retailers, less than car lots, Painted, $2.03; Galvanized, $2.33; Staples, bright, in car lots, $1.88; Galvanized, $2.18; car lots to retailers, 10 cents extra, with an additional 5 cents for less than car lots.

Pittsburgh.—New orders being placed for Barb Wire are comparatively light, due to the fact that large consumers covered ahead for some time prior to the advance in prices and are now specifying freely against these contracts. A fair volume of new business is being entered, but it is smaller than for some time. Prices on Barb Wire are firm, on the basis of $2 for Galvanized and $1.70 for Painted, in carloads and larger lots, f.o.b. Pittsburgh.

Plain Wire.—Shipments from mill on orders placed at the low prices are being made in large volume. The demand from manufacturers is more active than for some time. Quotations per 100 lb. to jobbers in carload lots are as follows, on a basis of $1.50 for Plain and $1.80 for Galvanized, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days, the usual price to retailers being 5 cents additional:

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	1.55	1.60	1.65	1.75	1.85	1.95	2.05
Galvanized	1.80	1.85	1.90	1.95	2.05	2.15	2.55	2.65

Chicago.—Specifications against the heavy contracts recently placed are coming in freely, together with a fair amount of new orders. Manufacturers of Woven Wire Fences and Bale Ties are calling for material to meet active demand in these lines. We quote Plain Wire as follows: Car lots, to jobbers, $1.68, Base, f.o.b. Chicago.

Pittsburgh.—New orders being placed for Plain Wire are comparatively light, due to the fact that consumers covered pretty well ahead prior to the recent advance in prices and are now specifying very freely against these contracts. Shipments by the mills are heavy and the trade is anticipating a further advance in prices to be made in the near future.

Spooled Wire List.—The Spooled Wire manufacturers have decided to eliminate entirely the list on Soft and Spring Brass Wire on spools. The Copper Wire list will be used also for Soft and Spring Brass Wire. This is done to remove inequalities which have existed in the prices for these goods, inasmuch as for a long time the three items, Soft Brass, Spring Brass and Soft Copper Wire, have practically all cost the same to manufacture.

Galvanized Ware.—This line, to the irregularity of which we have repeatedly called attention, gives as yet no indication of improvement, prices being badly broken, owing to very strenuous competition between some of the manufacturers. There are indications that the trade are looking on these goods as getting into a position where it would be safe to place orders for future needs, but as yet there has been comparatively little of this on account of the continual settling in price.

Copper Wire.—Bare Copper Wire for electrical purposes has been advanced another quarter cent per pound, making the present price 15 cents in carload lots, mill shipments. Less than carload lots are quoted at the usual advance.

Stove Pipe Wire.—Somewhat higher prices are announced on Stove Pipe Wire in sympathy with the recent strengthening of Wire prices generally.

Merchant Pipe.—This is a line which is characterized by a steady tone and an excellent maintenance of prices. There is also a good volume of business. The situation is such that there has been some expectation of an advance, but thus far it has not taken place. The mills, however, are refusing to accept orders for future delivery at existing prices.

Bolts, Carriage, Machine, &c.—There have been no marked developments in this market, and prices as a rule are unchanged. There is not, however, entire uniformity in the quotations of the different manufacturers and the tone of the market is not strong, notwithstanding the efforts to maintain existing prices, which are low, in view of the cost of manufacture.

Dripping Pans.—This is a line on which low prices are ruling, with the development of slight weakness here and there.

Axles.—There is no material change in the prices of Axles, but the market is not especially strong, and on some kinds slightly lower quotations are current.

Vitrified Sewer Pipe and Fittings.—Improvement is noted in the condition of the Vitrified Sewer Pipe and Fittings market, both in a slightly better demand and more harmony among the larger manufacturers regarding prices. The general price has advanced to 85 per cent. discount for first class goods and 87 per cent. discount for second class. These are reported as well maintained, except in cases of active competition. An improvement in demand is anticipated for the fall.

Sash Weights.—Owing to the increased cost of raw material, supplemented by an improved demand, some of the manufacturers of Sash Weights have advanced the goods about $1 a ton.

Binder Twine.—Since the advance in the price of Sisal fiber it has been a question of some moment whether the price of Twine would be advanced in consequence. As yet no higher prices have been announced, and if manufacturers have enough of Sisal fiber purchased at former low prices, there appears to be little reason for an advance in Twine prices. The advance in fiber has strengthened the Twine situation and is calculated to hold the market steady if crop failures do not considerably lessen requirements. Regular schedule prices are as follows:

	Cents per lb.
Sisal	7½
Standard	7½
Standard Manila (550 ft.)	8
Manila (600 ft.)	8¾
Pure Manila	10

Carloads are ¼ cent less; 5-ton lots, ⅛ cent less; fall terms; central delivery. For delivery at Missouri River and Northwestern distributing points ¼ cent is added.

Linseed Oil.—No change in card prices has been announced, although an advance has been predicted. The market maintains its former strong position. Receipts of Flaxseed at primary points are exceedingly light and crushers are not urging sales of Oil, as they expect to obtain higher prices before the new seed crop, which is not yet all planted, is available. Large buyers generally supplied themselves with Oil before recent advances. Quotations for 5 bbl. or more are as follows: State and Western Raw, 58 cents per gallon; City Raw, 59 cents per gallon, with the usual advance of 1 cent for less than 5-bbl. lots. Boiled Oil, 1 cent advance on Raw.

Spirits Turpentine.—The market has tended toward weakness rather than strength during the week under review, but shows more firmness at the present time. The local market is represented by the following quotations: Oil Barrels, 41 to 41½ cents; Machine Made Barrels, 41½ to 42 cents per gallon.

Window Glass.—Some half dozen hand operated factories are reported as having gone out of blast during the week. One of the American Window Glass Company's factories, it is understood, was started on the 7th inst. and another will follow on the 15th. At a meeting of the

Eastern Window Glass Jobbers' Association, held in Boston on the 4th inst., the discounts from jobbers' list, October 1, 1903, for territory east of the Mississippi were announced, as follows: New England and Middle States, from jobbers', single, 90 and 35 per cent.; double, 90 and 40 per cent.; factory shipments, single, 90 and 45 per cent.; double, 90 and 50 per cent.; some portions of Pennsylvania are accorded discounts 5 per cent. better than other States; in the Southern States discounts vary from 90 and 25 to 90 and 40 per cent. on single, and from 90 and 30 to 90 and 45 per cent. on double, from jobbers.

Rope.—May is generally regarded as having been quite a satisfactory month in the Cordage business and some manufacturers report June starting off well. Other handlers of Rope find that, since the trade purchased immediately after Fiber commenced to advance, business has not been so good. The market has lost some of the irregularity that characterized it last week, and there is a good deal of uniformity in quotations. The market may be represented by 8½ to 8¾ cents per pound, base, for Pure Manila Rope of the highest grade, and a corresponding quality of Sisal at 7½ to 7¾ cents. Lower grades of Pure Manila can be purchased at ¼ to ½ cent less than the foregoing quotations. Second grade Sisal is quoted at 6½ cents and third grade at 6 cents per pound. Jute, ¼ in. and up, No. 1, is quoted at 6¼ to 6½ cents, and No. 2 at 5¼ to 5¾ cents.

MAKING GOOD IN BUSINESS

HINTS AND SUGGESTIONS FROM MANY SOURCES

Opportunity.

A craven hung along the battle's edge
And thought, "Had I a sword of keener steel—
The blue blade that the king's son bears—but this
Blunt thing—!" He snapped and flung it from his hand,
And lowering crept away and left the field.

Then came the king's son, wounded and sore bestead
And weaponless, and saw the broken sword,
Hilt buried in the dry and trodden sand,
And ran and snatched it, and with battle shout
Lifted afresh he hewed his enemy down
And saved a great cause that heroic day.

—*Edward Rowland Sill.*

Practical Pointers.

Stimulating Influence.—The business man who doesn't believe in advertising belongs in the same category with the farmer who doesn't believe in fertilizing the soil. The husbandman can gather several successive but constantly diminishing crops from the same piece of ground without restoring to it the life-giving elements of which he robs it; but there comes a time when, completely exhausted, the land refuses to respond to agricultural entreaty. The business deprived of the stimulating influence of publicity furnishes an apt parallel—gradual failure, ending in complete paralysis of its functions. Advertising, like fertilizer, is mighty cheap in proportion to the money value of the growth it promotes.—*Quincy (Ill.) Herald.*

Hidden Strength.—It is a great day in a man's life when he truly begins to discover himself. But beneath the surface of every man there must be, in the nature of things, a latent capacity greater than has yet been discovered. And one discovery must lead to another until the man finds the deep wealth of his own possibilities. History is full of the acts of men who discovered somewhat of their own capacity; but history has yet to record the man who fully discovered all that he might have been.—*W. P. Warren.*

The Quality of Pleasing.—You may win some trade through a series of duels, winning custom over and against your rivals by cleverness or generalship of selling, but continued prosperity will largely depend upon the quality of pleasing, which must emanate from you and dominate your establishment.—*Printers' Ink.*

Honesty in Selling.—If any of you are connected with firms that are selling goods that are not what they are represented to be I would advise that you change your position. You should be able to study the goods you are advertising so that you will know just what they will and will not do, and in your advertising be as honest as your firm expects the men connected with the financial department to be.—*H. C. Atkins.*

Making a Summary.—It is a good practice to draw up and put on record an abstract of the reasons upon which you have come to a decision on any complicated subject; so that if it is referred to there is but little labor in making yourself master of it again.—*Arthur Helps.*

Not Worth Advertising.—A writer with a gift for phrasing once wrote: "If your store is not worth advertising, advertise it for sale." His phrase runs trippingly, but his logic halts.

To sell a store that is "not worth advertising" would be to defraud the buyer—so that the advice is ethically unsound.—*Savannah Press.*

The Dead One.

Sad is his lot, for him no hearse;
His day is passed, the public show it.
That's bad, no doubt; but what is worse—
To be a dead one and not know it.

After an honorable and successful career in the Hardware line, covering a period of more than 54 years, K. D. Horrall, Olney, Ill., has retired from active work. Mr. Horrall, who is 72 years of age, began his business career in Olney, starting with a tinshop, from which the present large establishment has developed. The business will be continued under the style of the K. D. Horrall Hardware Company, with stores at Olney, Bridgeport and Lawrenceville, each personally managed by one of his sons. Two years since the Bridgeport branch was opened under the management of A. Horrall. The Lawrenceville store has just been started and is under the management of H. C. Horrall. The principal store at Olney is under the charge of Walter Horrall.

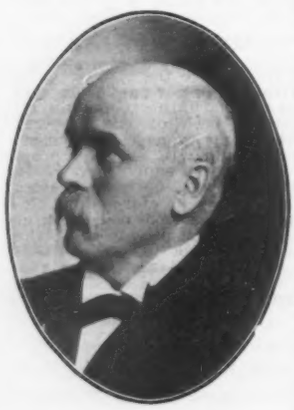
Hubbard & Co., Pittsburgh, Pa., have just been awarded what it is believed to be the largest order ever placed by the United States Government for Shovels, Tools, &c. These Tools are for the Isthmian Canal Commission and comprise some 45,000 Shovels and several carloads of Tools. The order was given largely on account of the excellent service rendered by the Tools previously furnished by the company, which have been in use on the canal since the Government began the work. This company is the only manufacturer of Shovels in Pittsburgh, and is also a large manufacturer of Bolts, Nuts, Washers, and Pole Line Hardware. In the last three months Hubbard & Co. have increased their output in all departments, and are to-day doing the largest business in their history of 67 years' continuous operation.

Through an omission in last week's report of the National Retail Hardware Association's Convention at Milwaukee, the name of William Frankfurth Hardware Company was not included as it should have been in the list of jobbers and manufacturers named as having provided the entertainment enjoyed on that occasion. The oversight was particularly unfortunate since this concern bore a very conspicuous part in the preparation and management of the festivities.

A Unique Gavel Presented to A. T. Stebbins.

Wood from 27 States—Sumptuous Descriptive Volume with Autographs of the Delegates to the National Convention.

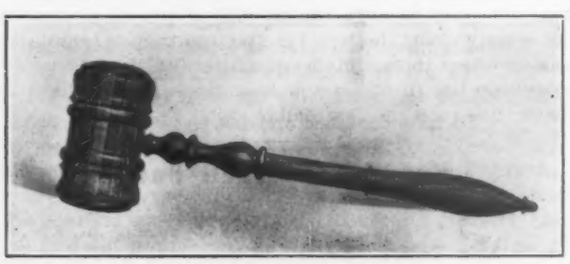
WHILE it is the custom of the National Retail Hardware Association to present its retiring president with a gavel as a memento of his services, it is seldom that such a gift possesses the rare historical interest that attaches to the instrument presented at the Milwaukee Convention to A. T. Stebbins of Rochester, Minn.



A. T. STEBBINS.

At the request of Secretary Corey and other officers of the association, each State secretary was requested to contribute a piece of wood for the construction of the gavel. The pieces thus collected came from 27 different States, and most of them are significant of notable incidents in the history of the country.

One face of the gavel is composed of a chip from the celebrated "Charter Oak" of Hartford, Conn. The genuineness of this piece of wood is attested by the affidavit



Historic Gavel Presented to A. T. Stebbins.

of Alfred A. Prall of St. Louis, from whom it was secured by F. D. Kansteiner, one of the delegates to the convention from that city. Another section of the head furnished by the State of Illinois came from the homestead of Abraham Lincoln at Springfield, and that contributed by Kentucky came from Lincoln's birthplace in La Rue County. Colorado sent a piece of white ash taken from the stage coach in which Horace Greeley had his memorable ride from Folsom to Placerville, Cal., the story of which is told in Mark Twain's "Roughing It."

Key to Gavel and History.

New England's offering came from the original timbers of the United States Frigate Constitution, known as "Old Ironsides." Michigan supplied a piece of white oak cut from the hull of the Steamer Huron, which since 1848 has rested on the bottom of the St. Clair River. A piece of pine from the school house at Ripon, Wis., in which was elected the first committee of the Republican party forms one of the sections of this gavel, and another is made of elm taken from a roof timber of the powder magazine at Fort Ripley, Minn., the scene of the Sioux insurrection in that State in 1862.

From a piece of cherry timber used in the construction of the old home of Horatio Seymour at Pompey, N. Y., came the section furnished by that State, and those from many of the other States were of no less significant origin. The case containing the gavel was composed in like manner, and with it was furnished a neatly printed volume bound in leather, bearing the title "Vade Mecum," "Lest You Forget," a paper covered copy of which was given to each of the delegates.

The Arkansas Convention.

THE programme of the tenth annual convention of the Arkansas Retail Hardware Association, W. L. Harlan, Little Rock, secretary, has lately been issued. The meeting will be held in Fort Smith on June 22, 23 and 24, the association headquarters being at the Hotel Main and the meeting and Hardware exhibition at Tomlin Hall. An interesting programme of proceedings has been prepared, which will include formal addresses as follows: "Retail Advertising," by H. T. Benham, advertising manager of E. C. Atkins & Co., Indianapolis, Ind.; "Cost of Doing Business and the Elements That Enter Into It," by A. V. Walker of Bracy Brothers Hardware Company, Little Rock; "The Advantage of the Cream Separator Trade to the Hardware Dealer," by D. L. Harcourt of the De Laval Cream Separator Company, Chicago, and "Getting a Profit," by J. Bailey Gordon of the Southern Co-operative Foundry Company, Rome, Ga.

A good deal of time will be devoted to the Question Box, which will be under the efficient supervision of former president E. E. Mitchell, Morrilton. A number of questions which will thus be presented for discussion are given a place in the printed programme, but these are merely suggestive and any other questions will be welcome. The exhibition hall will be attractively arranged and 45 manufacturers and jobbers will be represented with a total of 65 booths.

WILLIAM PARKER BONBRIGHT, aged 26, a traveling salesman for the Russell & Erwin Mfg. Company, New Britain, Conn., was drowned in the surf at Atlantic City, N. J., Friday afternoon, June 3, while bathing. It is thought he was attacked by cramps in the chill water when too far out to be heard, if he called for help, especially so early in the season, and before a force of life guards had been enlisted for the protection of bathers. He was a son of J. S. Bonbright of the Supplee Hardware Company, and was graduated from Haverford College in 1904. He was an all around athlete and captain of the Haverford cricket team during its triumphal tour through England in 1904.

OWING to the increasing demand for its Edge Tools and Machine Knives throughout the Southern States the L. & I. J. White Company, Buffalo, N. Y., has established a branch at New Orleans, La., for the convenience of the trade. It is located at 312 Gravier street, and is under the management of Dick B. Williams. Its situation, right in the heart of the Hardware and mill supply district of the lumber manufacturing section, furthers in more ways than one the company's aim to render satisfactory service to its customers. An adequate stock will be carried and all orders will be given prompt attention.

J. B. SHARP, Chemical Building, St. Louis, who also represents Worth Bros., has been appointed general Southwestern agent for the Champion Rivet Company, Cleveland, Ohio.

THE QUESTION BOX

This department is open for the discussion of questions which arise in the practical conduct of the Hardware business. Our readers are invited to contribute, submitting inquiries or answering questions.

Correspondents are expected to give their names and addresses, but in order to encourage frank expressions of opinion the advice of our correspondents will be treated in confidence, names and addresses not being published.

For convenience, Questions or Answers should be addressed to THE IRON AGE QUESTION BOX, 14-16 PARK PLACE, NEW YORK.

Form of Lease and Note Used in Sales on the Installment Plan.

In *The Iron Age* of June 3 was given a form of lease for goods sold on installment plan and also a copy of a note which has been used with success by an Indiana Hardware house.

Herewith are presented other forms of lease and note, for which we are indebted also to an Indiana Hardware merchant who makes use of them in the sale of stoves, farm machinery, &c., on installments. Both of these methods will doubtless be suggestive to merchants selling goods in this way. The form of lease used by our correspondent is as follows:

....., IND., ..., 190 .

THIS CERTIFIES that I, ..., now residing at ..... street, ..., ...,
(*Town*) (*State*)
have received of ..... Hardware Company, a corporation, of ....., Ind., the following described personal property, to wit:
the same being all in good order and of the value of .....
.....
.....
Dollars, which I am to use with care and keep in like order and repair at my own expense, and for the use of which said property above described I agree to pay as follows: ..... Dollars on the delivery of this agreement, the receipt whereof is hereby acknowledged, and accepted as payment for the rent of the first month only, and then at the rate of ..... Dollars per month, payable strictly in advance on the ..... day of each month, hereafter, at its main office, ... street, ..., Ind., without further notice or demand.

But if default shall be made in any of said payments, or if I shall sell, remove or attempt to remove said personal property above described from my premises above described without the written consent of said ..... Hardware Company, then and in either case I agree to return said property, and I also agree that said ..... Hardware Company, or its agent, may resume actual possession thereof, and I hereby authorize and empower said ..... Hardware Company's agent to enter the premises wherever said personal property may be and take and carry away the same, and receive back possession of same thereof, and I hereby waive any action for damages or trespass therefor, and disclaim any right of resistance thereto, and also I waive all rights of laws of exemption against this obligation.

It is also further agreed that I may, at any time, within said rental term as above, purchase the said above described personal property by paying the above valuation therefor, and then, and in that case only, the rent therefor paid shall be deducted therefrom.

I further agree to make above rental payment without relief from valuation or appraisement laws, and that any extensions granted me shall not in any wise void or set aside any rights of said ..... Hardware Cmpany, above set out, and that in case of such extensions I agree to pay interest on rental sums at rate of eight per centum per annum from date of payment due.

Witness my hand and seal, this .... day of ...., 190 .
..... (Seal.)
.... (Seal.)
Attest:
By .....

This guaranty is added if desired:

....., IND., ..., 190 .

For value received, I hereby guarantee the prompt and full payment of the installments of rent within mentioned to ..... Hardware Company or its assigns.

.....

Witness:
.....

The note which is given below is used when the company desires to discount it at the bank. It is explained that banks are ready and willing to accept such notes, and that the discounting of them does not in any manner vitiate the company's ownership to the goods until the note has been paid.

....., IND., ..., 190 .

..... after date, for value received, ...
(*Date of payment to be made*)
promise to pay to the order of ..... Hardware Company (corporation), ... Dollars, at ..... Bank, ..., Ind., without any relief whatever from valuation or appraisement laws, with interest at the rate of eight per centum per annum after ....., and until paid, and
(*Insert either "date" or "maturity"*)
Attorney's fees. The drawers and indorsers severally waive presentment for payment, protest and notice of protest and nonpayment of this note.

.....
.....

It is expressly agreed that the title to the ....., for which the above note is given, shall not pass from said ..... Hardware Company until this note and all other notes given for the purchase price of said property above shall be paid in full. If default is made in payment of this note, or if undersigned attempts to sell said property, or remove same without authority of said ..... Hardware Company, or if same is levied upon by process from any court, then said ..... Hardware Company may declare this note due and may take possession of said property and sell same at public or private sale; the net proceeds after payment of all costs of seizure and sale shall be applied to this note, and any balance due on this note, the maker and indorsers agreed to pay in consideration for use of said property for value received.

.....
.....

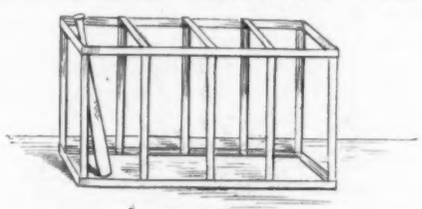
No. .....
Due, ...
P. O., ...
Residence, ...
Witness, ...

Form of Note Used by an Indiana Hardware Firm in the Installment Sale of Stoves, Farm Implements, &c.

The form of lease, or rental contract, is one the company uses in case of sale of stoves or machinery and does not want to have the trouble of recording same at the county court house; for the contract is absolutely good without being made a matter of record, as the ownership lies in the one making the sale until the purchaser has paid the last dollar.

Handling Baseball Bats.

In reply to the inquiry as to a satisfactory method of handling baseball bats we are in receipt of advices from a New England house which has taken care of this line in several ways. One of these is the kind of rack herewith illustrated which was formerly used for golf clubs. This method has proved very satisfactory. The rack is about the proper hight, 15 in. wide and 4½ ft. long. Two of these racks are used, being divided up into



Rack for Displaying Baseball Bats as Used by a New England House.

spaces of about 12 x 7½ in. The rack thus made stands on the floor in a prominent place and, showing the bat the full length, makes an excellent display. It is found very convenient for customers to walk up to it and make their selection.

From a house operating several stores we have the following advices in regard to the methods used in handling baseball bats. The methods employed in the different establishments vary somewhat as represented by the following advices of our correspondents:

FROM SOUTH CAROLINA MERCHANTS: In one of the stores this stock is carried on the shelves; in another the original crates in which the bats are received are used, the crates standing up, with part of the top sawed

off, allowing the ends of the bats to be in sight; in another store use is made of a square upright box especially made to contain the goods; while in still another establishment the bats are simply placed on the stand on which stoves are displayed.

Our correspondents express the view that the best way to display this class of goods would be to have a neat, upright box made about 6 in. shorter than the bats and large enough to hold half a dozen of each kind of bat carried in stock. This box should be neatly painted and displayed as near front of store as possible.

Careful Buying in the Retail Hardware Store.

Does it pay a retail Hardware merchant to be a careful buyer, getting quotations from different parties; or is it safe to trust the jobbing house from whom he usually buys?

There is no doubt that one of the weak points in many Hardware merchants is neglecting to give proper attention to the prices paid for goods. While Hardware merchants can count upon fair treatment from those from whom they purchase, it is usually the case that a careful buyer who is well posted and takes the trouble to get quotations from various sources will succeed in saving a very respectable percentage on his purchases. He must, of course, be reasonable in the matter and not expect on his small orders to obtain as low prices as are given to those who buy in larger quantities. How far this matter should be carried and on what lines the buying should be conducted is a practical subject on which we invite expressions from the trade.

FROM AN OHIO MERCHANT: As relating to this general subject we have advices from a Hardware merchant in Ohio to the effect that, having occasion recently to sound the market on Coil Chain in a moderate quantity, he wrote to two prominent jobbing houses. On ⅝-in. Coil Chain one of them quoted $4.60 and the other $3.25 per 100 lb., or about 25 per cent. less. On 1¼-in. Chain the discrepancy was not so great, the low man naming $3.65 and the other $4.20, or nearly 15 per cent. less. Our correspondent refers to this as perhaps somewhat exceptional, but it illustrates a principle.

The Hardware Club Manual.

THE manual of the Hardware Club, New York, for 1909 has recently been issued. As in the past, from the first issue, it has been compiled by Alfred D. Clinch, always a governor of the club, and at present its treasurer. There is little change in the contents other than the customary alteration in membership data necessary to indicate the existing representation, the names of members and all other matter, showing the same careful attention to detail the book has always received from its compiler.

THE BENEDICT MFG. COMPANY, manufacturer of silver plated ware and metal goods, East Syracuse, N. Y., had all its traveling representatives at the factory during the last 10 days in May getting out samples for the fall. The company entertained the visitors at South Bay, Oneida Lake, with an afternoon of fishing, followed by a banquet at Crownhart's Hotel. The outing was attended by H. L. Benedict, president; C. C. Graham, sales manager; R. B. Roantree, treasurer; W. M. Upright, advertising manager; A. F. Saunders, designer; Edwin Dorner, manager of the New York office, and the following traveling representatives, whose territory is given in connection with their names: John Bailey, Pennsylvania and Virginia; J. F. Kane, New York and New Jersey; J. P. Deal, Atlantic Coast States; W. A. Van Patten, Ohio and Indiana; H. S. Osmun, Michigan; F. J. Reynolds, Middle Southern States; F. A. Weatherley, Illinois, Iowa and Nebraska; Newton Owen, special representative; A. I. Patton, Kansas and Oklahoma; J. H. Webster, Wisconsin, Minnesota, North and South Dakota; M. H. Jackson, Pacific Coast and Honolulu; L. G. Proctor and J. H. R. Proctor, Dominion of Canada.

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One-Twelfth Gross Ideas—Assorted Small.

Business Pointers from a Merchant of 45 Years' Experience.

Prescription for Overwork—Developing Clerks—Partnership Friction—Meeting Catalogue House Competition—High Credit Standing—Looking After the Financial End—The Buyer's Importance.

AN ADDRESS BEFORE THE NATIONAL RETAIL HARDWARE ASSOCIATION BY GEORGE W. HUBBARD, FLINT, MICH.

THERE is nothing new under the sun, so you need expect from my subject, "One-Twelfth Gross Ideas—Assorted Small," only new prescriptions for old complaints. They may possibly relieve tension in the strained places and make the collar fit smoother on the old callouses or new sores. They will be suggestions rather than wearying arguments, hence rest from thought. You can sleep through the reading with more profit than by keeping awake.

Overwork.

My first prescription is for an almost incurable disease called "overwork." Some people pass through life without a pang of it. Ordinarily it is an inherited trouble and can be traced to poverty, pride or ambition. We all want to get on in life and we start out in business trying to beat that old enemy "over-head expense" by sacrificing our best days and strength, doing with our own hands thousands of things we could profitably delegate to cheaper workers. Strong backs are good, but strong heads are better. The captain of a vessel does not "swab" decks, the president of a bank does not "sweep out," but many of us through force of habit and lack of thought continue "swabbing" and "sweeping." It seems harder to break the habit than do the work. The date is now when that condition cannot continue. There is so much more to do on account of the narrow margins of profit and the necessity of reaching greater volume that other shoulders must stand the strain of increased responsibilities. Most of us are slow in appreciating the rapid increase in population or the possibilities of increasing the volume of our business. While we are developing a larger business it is within our possibilities to develop greater capabilities in our clerks. More "runt" salesmen have been developed by "runt" proprietors trying to do all the work than from all other causes combined. It is embarrassing to see ourselves as others see us, but if we do balk at holding up this mirror we have friends who will do it for us—the world is sure to see the picture.

Over-Head Expense.

"Runt" Salesmen and Proprietors.

Write a new business creed based on modern ideas of system. It will save your brain and back, lessen the hours of work and increase the hours of rest. There will be a different atmosphere in two places—in your home and in the store; wife and children will no more be the dumping ground of your imaginary discouragements, and your employees will be divorced from similar annoyances; true, none of them intended on your part, but the natural products of an overworked brain and an overworked body.

Different Atmosphere.

Well Paid Clerks and Well Assigned Duties.

There are two important things usually lacking in a retail Hardware store—well paid clerks and well assigned duties. There is to-day a wider difference in the cost price of strong brains and strong backs than ever before, and the wise manager is the one alert in discovering and advancing the interested and intelligent employee. Nothing puts more ginder into a lagging lot of salesmen than picking up a bright one in the rear and passing him over indifferent heads who have supposed themselves safely intrenched in front; assuming that this is all done fairly and is well deserved. The demand for efficient and classy clerks has outgrown the supply. I mean the old-fashioned working clerk with new-fashioned alertness. Perfect organization is far more difficult to obtain in a small business than in a large one. The large one must have it down to perfection, but if gone at with that determination in view, the small one, or the retail, can approximate the same result. Among the essentials to attain this end the division of duties must be clearly defined. To bring this about monthly or semimonthly meetings for half an hour must be held by proprietors and clerks. For that time they must be on equal footing, helpful suggestions invited, and, if possible, adopted. Frequently these come from minor clerks. Altogether, you thresh out in the open and dispose of many simple things that if not explained in this way might grow into grievances. An imaginary grievance is an industrious germ that may hatch out troubles. These meetings are frequently a surprise party in that some of the better suggestions come from a young clerk low down in the salary list, one who is giving evidence of an approaching raise, and it is another tip to the proprietor to keep an eye on that chap before his merits are recognized by some competitor. Summed up, I believe we must rely upon our own kindergarten for our best clerks, and their efficiency depends much on our ability to both hold them to our bosoms and yet keep them at arm's length. There is something in business besides profit got by grinding day and night to the exclusion of rational pleasure, little of which many of us have enjoyed in the past, or will until we have thrown the fetters off our own limbs and placed the responsibilities on the shoulders of others.

Generating Ginger.

Division of Duties.

Clerks' Meeting.

Organizing Clerks.

The average retailer's volume of business has been so limited, his clerks so few, he has been doing too much with his own hands. It has cost him loss of profit and made life a drudgery. I look back upon a forty-five year history of blunders and am now slowly awakening to enjoy the advantages reached by placing each man in a niche he fits. Owing to the simplicity of the situation I wonder it did not appeal to me earlier in life. Clerks, like partners, have to be first, second and third in responsibilities. Put your best clerk nearest the front door latch and keep him there. Do not let the matter of price interfere with the success of your new plan. See that he is one than can command the confidence of the public and the respect of the other clerks. Have him stay where you have placed him and demand that he shall not sweep out or wheel freight, but that he sees it is done by others and done right. He must be good enough when you are absent to adjust such matters as warrants, &c., with admirable policy; in fact he must be broad enough to preside at a Hague Peace Conference, able to satisfactorily arbitrate and settle minor difficulties that occur among the clerks under him or with customers. Passing from him to the other clerks, and I am thinking of a business employing half a dozen or more, where the business is now good and getting better, each must be assigned to their positions and taught not to breed confusion by jumping over each other and getting out of their own jurisdiction. Your monthly and semimonthly meetings with your help, referred to in the earlier part of my talk, will make you familiar with the individual strength and weakness of your clerks, and in time, and only through time, you will master the situation and eliminate a vast amount of friction so common in the ordinary retail Hardware store. This may sound to you theoretical because of the difficulty in securing interested help. Make your own help if you cannot find the finished article, manufacture it from the best raw material available. The best recruiting office which I have found has been my barn, from which came some bright country boys. Not one in ten proved good enough to warrant advancing from the barn to the store, but when I did find one that milked the cow dry and yearned for

Best Clerk Near the Front Door.

Taught Not to Breed Confusion.

Finding Recruits.

more chores to do and did them well he was picked up and advanced to the dignity of a clerk. Not less than eight boys rescued from that humble beginning are to-day successful Hardware merchants in the State of Michigan. It carries out an old theory that I have had for years. You have occasionally got to get a little cross breeding through the good country raised boy to build up the quality of our city degenerates.

Partnership Quarrels.

If trouble ever arises in partnerships in any kind of business in any part of the country I venture to say 19 times out of 20 it is traceable to one cause and one only. If I make it clear to you and you never before thought of it in the light presented you will wonder why you have not. There is only one real manager in any partnership, whether that co-partnership consists of two or a dozen men. That is the one the firm selected as the financier. He is the captain of the company, and all the rest are either lieutenants, corporals or privates. He is the boiler, the others are the steam gauge, water glass and valves—they are simply accessories. Overbuying by the floor partner without consulting the financial partner and learning from him the condition of the firm's finances is the very beginning of partnership friction. No success is reached when any floor partner ever said of the office one, "If he will attend to his business I will to mine." There is no time in the history of a partnership when that doctrine is not absolutely dangerous and foolish, while it is true all are equal partners and share equally in the profits and dignity of the concern in the eyes of the public. To avoid trouble and always do business on Easy street work under your natural leader, work with a willing, helpful heart, for his is the position that brings on night sweats, nervous prostration and suicide. Floor partners, don't go home and tell Mary that the office partner don't work as hard as you do, for that is false, providing he is doing his full duty. You will sleep well and grow fat while overbuying from an agent that has jollied you, while the financial partner has worried and grown thin trying to borrow from a banker that cannot be jollied. Summed up, recognize by constant consultations with your financial partner the importance of his work, the necessity of not marching in advance of him, and stop adding to the firm's liabilities when he sounds the warning, which he should do when he cannot discount every bill maturing. I repeat, 19 out of 20 differences that occur between partners arise from the one cause—not placing one man at the head and then not recognizing that head. It is not humiliating to do it, and it is often humiliating when it is not done.

One Real Manager.

Others Are Accessories.

Pulling Together.

Catalogue House Competition.

I am not and never have been in accord with the majority of merchants on this subject. All classes of them from the shoestring vender to the big silk merchant, including the hardware merchants of the United States, have lived through a reign of terror on account of this modern competition, which is just as legitimate a business as our own, and if they make it succeed along their chosen lines better than we make our business succeed along our chosen lines I am ready to take my hat off to them and say they have more right to prosper than I have. Aside from this one yellow streak in you I challenge the world to equal you in courage and wisdom. I will not admit what much of the Hardware literature confesses, that I am afraid of the catalogue houses and cannot successfully meet them in an open fight. I would see that the laws were not made more favorable to them than to myself, and so far I am with you, but I would not ask the government to discriminate against them, and would be exceedingly careful that the public did not get the impression that my efforts in this direction were imperilling their interests. In short, I believe in a still hunt, and while I would turn a trick neatly on a competitor every time I had a chance I would not do it by the aid of either brass bands or legislation. Merchants weaken themselves and advertise the catalogue houses by discussing this competition over their counters or with their customers who they believe have been buying away from home. All reference to them advertises the catalogue house, and it is exactly what they want done. Articles are written by individuals and published in trade papers—we openly discuss them in our meetings, and the catalogue houses get hold of those papers and discussions, shrewdly repeat and furnish the public with our sayings and doings, and I ask what better ammunition could we furnish our enemy's guns? The still hunt will win against the hurrah boy parade in any kind of business. I would do business first and explain afterward. You never saw a well-fed lot of stock wandering away to feed at a neighbor's farm, but you have heard and seen lean and skinny ones rooting under the neighbors' gates and breaking over fences to get at food. The point is this: Keep such a supply of merchandise in your own store and so priced you can safely appeal to the intelligence of your customers and show them they cannot afford to go away from you, for you have the quantity and the quality and the price. With that condition existing I doubt if many of them will go or want to go. I have heard more good men say they would rather leave their money in their own home town than I ever heard say they were spending their money in Chicago or other points. I believe it is up to us to meet this competition with full stocks, reasonable prices and cordial greeting on the part of ourselves and our clerks. The managers of catalogue houses are flesh of our flesh and bone of our bone, and there is nothing in the conditions surrounding their business life and the conditions surrounding our business life preventing our making our several places of business as attractive to our trade, backed by our personal acquaintance with our customers and their personal acquaintance with us, that leads me to believe that they possess any natural advantages over us unless I am ready, which I am not, to admit they are better business men than I am. The public is being educated apace with ourselves and it is possible conditions do not maintain now that did two, three or five years ago. This is especially true of farmers who now enjoy telephones, electric cars, magazines, newspapers and schools, with more time to enjoy and be benefited by them than formerly, and I might add more time for such enjoyment than we have—they are well past the gold brick period and the catalogue houses and other strangers to them have to hand them out to our farmer friends with greater caution to-day than ever, as the situation is much better understood by the average man not in trade.

Business Is Legitimate.

A Still Hunt the Best Policy.

Playing Into the Enemy's Hands.

Cannot Afford to Go Elsewhere.

Gold Brick Period Passed.

Building Up a Credit.

Every one of us is striving to buy goods cheap, cheaper than our competitors, if possible. There is just one simple, direct road that will accomplish this result—beat the other fellows in paying promptly and getting the largest discount on every bill. Make it so manifest in *Dun's* and *Bradstreet's* that every manufacturer and jobber will want your business and give you a price. There are several voluntary contributions the wise man makes that the unwise refuses to make in this matter of rating. One is a mistake made in refusing a financial statement to commercial agencies, such as *Dun's* and *Bradstreet's*. This refusal arouses a suspicion, and you can easily have an injustice done you. Another is the reputation you establish with the manufacturer and jobber in adjusting differences, such as shortages, breakages, warrants, &c. They will not believe a word you say if you do not occasionally find an over or something under priced, or you have failed to report a footing or an extension that favored you. You do not hear them say you are not honest, but they know you are not, and they raise your credit spelled with a "z." We are judged by our letters; we do not have to go through a corre-

Financial Statements.

Shortages, Breakages.

spondence school to learn truth and courtesy. When you are writing or dictating a letter remember that those you buy from never saw you and never will, and all they know is what they can judge from hearsay and as you make yourself appear in your letters. Herein lies an opportunity for making a good or bad impression; in fact, it is almost your only way. A majority of the office men who read our letters are so accustomed to that work they become experts, and can read between the lines, and can tell before we have finished whether we are telling them the truth, the whole truth, and nothing but the truth. You may not spell well and lack in rhetoric, but you can give exact facts in a pleasant way and thereby help your credit.

Pointer on Correspondence.

There is another way of building up your credit which is not the least, although the last, under this head. It is the impression you make on the traveling agent. Wise boys are they, with eyes and ears in every part of their anatomy. They don't expect you will buy every time they call, but they do expect every time they call to find you with a good clean stock of both manners and merchandise, and if you are out of either their house will get the report sooner or later, and that will have something to do with your credit and buying powers. I want to say just this one word for the average traveling man, and he certainly makes our commercial report with the house he represents. In those particular lines he brings to us he should be so thoroughly familiar with them that we can justly place him on the pedestal of instructor. He should know, and generally does, more about the line he represents than we have ever had an opportunity to learn. It pays us to put a large measure of confidence in the traveling men. They do not now, if they ever did, resort to trickery, knowing exactly the final result of such a course. While he is contributing to the upbuilding of our credit he is doing the same for himself. Our work is mutual, and whatever benefits one does the other.

Traveling Man's Impressions.

Old Fashioned Financiering.

I don't care how good my bookkeeper is, or how shipshape he or she gets off the monthly balance sheet, those sheets don't contain just what I want to know quite often enough each month. I must know every Monday morning of every week in the year exactly how much we owe, who we owe it to and when it is due. So, every Saturday night I turn to the only part of the ledger that particularly interests my creditors, and on a sheet of paper I set down every dollar of my indebtedness, foot it on the adding machine, then take from that list all accounts to be paid during the coming week and learn that amount. I have now reached the point where real financiering begins. To the cash balance on hand I add the sales and collections for a week ahead, conservatively estimated, and if these do not prove sufficient and money is to be borrowed, that amount I put in red ink. Red ink is only used when we must borrow, and it becomes a sign of distress, and appears just as few times each year as possible. It means hold up the buying, attend to the collections, get better hold of the finances. Running a business is like running an automobile or driving a horse—you can manage either one of them better if it does not get the start of you. A great deal more mismanagement can occur in the 30 days intervening between each monthly statement than between two consecutive Mondays, and the load is not likely to topple so much that you cannot push it back if you see it in time, so it don't do any harm and may do much good to sandwich in about four extemporaneous statements in the intervals between the regular ones. Under the head of old-fashioned financiering I have a suggestion especially helpful to a beginner, and not bad for old timers. Have just one close confidential friend (besides your wife), and that is your banker. I have been on a bank board for years and learned that directors know but little about the financial condition of merchants on the street. Many theatre companies have what they call an "angel" who knows all about their affairs and puts up enough backing to head off "tie counting" between towns. It is wise to have an angel in business—let your banker be that one. Keep him wise to your true financial condition so he can lead the discussion when your case is up for consideration before the Credit Committee of the bank. You can always satisfy one man easier than you can half a dozen. You would rather have your law case tried before a fair judge than take the chances on a guessing jury's verdict. Please couple these two thoughts—the home-made weekly statement and the banker "angel," and you can, if you are honest and he intelligent, satisfactorily realize all business demands. It will avoid open board discussions sure to occur if every member of it does not know all about you, which knowledge is his right and duty to acquire. Directors are not always prudent, and needless suspicion may spring up and become troublesome unless our case is settled in advance. It is safer to take one man's hand and slide over thin ice than have the assistance of half a dozen men. It pays every business man to have one angel and keep him alive on a diet of facts without any fiction trimmings.

Indebtedness Figured Weekly.

Red Ink as a Signal of Distress.

Make Banker Your Confidant.

The Buyer.

Next in importance to the financier of a business is the buyer for the house, and in good judgment he must be the financier's equal. He pitches the game and the financier is the catcher. They form a battery, and the final standing of the house is all up to them. Poor pitching is sacrificing quality for price: overbuying to attain that end makes your stock dear, when to the cost you add rent, interest, depreciation, &c. More bad playing is in changing from standard lines with which your name has become identified and your trade looks to you rather for lines they know nothing about and labels they have never seen. This is utter folly. If a code of signals between a pitcher and catcher in a ball game is valuable some code should be established between your buyer and your financier, for there is much more at issue and errors are more costly.

The Pitcher in the Game.

Camillus Cutlery Company.

THE Camillus Cutlery Company, Camillus, N. Y., the proprietors of which are Adolph Kastor & Bros., 109 Duane street, New York, emphasizes the fact that its product is American in everything from start to finish, save in the steel of the blades, which are forged from Wardlow's best crucible steel. Marmaduke Wardlow of S. & C. Wardlow, Sheffield, England, availed himself of a recent opportunity to visit the Camillus factory, and expressed his gratification at finding that the company was using his best blade steel throughout the factory. This distinctively American enterprise established at Camillus, near Syracuse, seven years ago has been largely instrumental in increasing the population of the village from 500 then to about 1200 now. A feature of the plant is a new club house for the 250 to 300 employees, which was financed by A. Kastor & Bros., in which are bowling alleys, billiard room, stage and library, but in which neither intoxicants nor tobacco are sold or used. There is a benefit organization which insures to any of the members who may become ill a stated sum per week until the beneficiary is able to work again. There are also other social features pertaining to the club house beneficial to members of the employees' families, the tendency being to elevate and improve the working conditions of those thus identified with this growing enterprise.

BUTLER BROTHERS, Chicago, have acquired possession of the entire block square building bounded by Fulton, Desplaines, Jefferson and Wayman streets, a portion of which they have occupied for about two years. This structure is located only three blocks from the main plant, is splendidly lighted on all sides and contains 500,000 sq. ft. of floor space.

A New Export Manual.

"Elementary Lessons in Exporting."

A Valuable Book on Ways and Means of Going After Business Abroad.

"ELEMENTARY Lessons in Exporting," is the title of a new book of 450 pages, cloth bound, issued by the Johnston Export Publishing Company, 135 William street, New York. The author, B. Olney Hough, now editor of the *American Exporter*, was for some years prominently identified with the export business, not only with large houses in New York City, but in various commercial centers abroad. In this connection he made several selling trips around the world, handling varied classes of merchandise rather than a few particular lines, thus acquiring experience as an export merchant under actual and competitive conditions, an important factor when offering hints to manufacturer or merchant seeking business abroad.

The book describes conditions, methods and processes, and with a view to affording the investigator or prospective exporter an idea as to its character and breadth and scope we reproduce the table of contents as follows:

HOW TO GET FOREIGN BUSINESS.

Chapter I.—Direct Relations with Foreign Buyers.
II.—Conduct of Foreign Correspondence.
III.—Export Commission Houses.
IV.—Foreign Sales Arrangements.
V.—Advertising for Foreign Trade.

HOW TO HANDLE FOREIGN BUSINESS.

VI.—Packing for Export Shipment.
VII.—Invoicing Export Goods—Cable Codes.
VIII.—Formalities Involved in Making Export Shipments—Export Agents.
IX.—Ocean Freight Rates—Marine Insurance—C. I. F. Quotations.
X.—Financing Export Shipments.
XI.—Extension of Credit to Foreign Customers.

FAC-SIMILES OF DOCUMENTS.

Plate I.—One Form of Export Invoice.
II.—Statement or Bill of Charges.
III.—Measurement Statement Sometimes Used.
IV.—Shipping Permit and Dock Receipt.
V.—Shipper's Manifest, *i.e.*, Custom House Clearance.
VI.—Steamship Bill of Lading.
VII.—Certificate of Marine Insurance.
VIII.—Foreign Bill of Exchange (Draft) in Duplicate.
IX.—Letter of Instruction to Bankers.
X.—Letter of Advice to Customers.
XI.—Form of Agreement Sometimes Required by Some Bankers with Whom Bills of Exchange Are Negotiated.
XII.—Specimen of Consular Invoice (Cuban Form).

EXPORTER'S GAZETTEER.

(Arranged alphabetically by countries.)

CONVERSION TABLES.

Table I.—Metric and Avoirdupois Weights.
II.—Metric and English Lineal Measure.
III.—Metric and English Measures of Capacity.
IV.—British and American Moneys.
V.—French and American Moneys.
VI.—German and American Moneys.
VII.—Discount or Commission on Sterling.
VIII.—Interest and Discount on Sterling.
IX.—Equivalents in Foreign and American Moneys Per Units of Measure.
X.—Cost of Ocean Freight Per Cubic Foot.

While the volume is particularly helpful to the novice, there is much of value even to the experienced exporter, especially as a work of reference. The group of facsimile documents and forms serve an admirable purpose as illustrating methods employed in export transactions.

Pages 121 to 398 contain an exporters' gazetteer, arranged alphabetically by countries, presenting a condensed compendium of information relating to the principal States and colonies of the globe, their foreign trade and conditions incidental to commerce with them. For example, an obscure nook like the Seychelles are found to be a group of about 90 islands and islets in the Indian Ocean, nearly 1000 miles north of Mauritius, giving area, population, imports in rupees, how reached and to whom they belong. For Belgium, small in area but large in population, relatively, there are 3½ pages, giving names of principal towns, a concise history, facts as to production, industries and commerce, languages, money, weights and measures used, mail time, average freight time, cable rates, postal regulations, hints for both tourists and commercial travelers, customs tariff, consuls, shipping regulations, shipping routes and kindred data, varying with each country or section according to the territory described.

The conversion tables will be found helpful to exporters and importers of experience, as well as the beginner, and the same may be said of much of the text, although intended primarily for business men unacquainted with the subject. No attempt has been made to exhaust the subject, but rather in a well digested way, within the covers of one book, to guide the thought of intending exporters regarding ways and means for going after business abroad, no matter what market may be sought. The volume is a valuable contribution to the literature relating to export trade.

BUSINESS OUTLOOK IN AUSTRALIA IS ENCOURAGING.

FROM A SPECIAL CORRESPONDENT.

MELBOURNE, May 8, 1909.

NOW that the farmers have got rid of their wheat and wool and the money is getting into circulation the outlook for the rest of the year is more favorable. Prospects are considerably brightened by general rains, and trade is good and sound. The Plow season has been a good one, and Fencing materials, Barbed Wire and Rabbitproof Netting have had, and are having, good sales. The building trade continues active throughout Australia and also New Zealand. Backed up by favorable weather conditions the country's productiveness is increasing at a more than satisfactory rate.

A noticeable feature of the present time is the almost entire absence of the feverish speculation which in former years was inseparable from Australian trading and private life. Yet it is a pretty safe assertion that every man, woman and child in Australia to-day is better off in this world's goods than ever before.

Queensland, our most northern State, is attracting quite a number of new settlers just now by reason of its prosperity and the opportunities offered for land settlement. Wire Netting is in demand by the Queensland Government. Two contracts recently let were for 200 miles of 42 x 1¼ x 17 Netting to Thos. Brown & Sons at £24 6s. 3d. per mile, c.i.f. Brisbane, and 300 miles of same size and gauge to G. Wills & Co.

The Commercial Travelers' Association has just completed construction of magnificent new premises in Sydney. The building, a massive nine-story one, rises to a hight of nearly 130 ft. There are 20 bedrooms, and the flat roof is laid out as a winter garden. The building cost £35,000 and is a splendid addition to Sydney architecture.

O. V. B. Want Book.

A VERY neat and useful O. V. B. want book designed for the use of retail dealers has just been issued by Hibbard, Spencer, Bartlett & Co., Chicago, Ill. The book is 5½ x 10 in., substantially bound in paper board covers, and in addition to about 120 blank memorandum pages it contains in the front and back a number of printed pages devoted to the description and illustration of some of the company's leading lines, together with useful tables and information of general interest. Some of the basic principles of business laws are concisely embodied in a short chapter on this subject, and an electrotype scale furnishes ready means for estimating the cost of electrotypes. Other tables include the cost of tin roofing, comparative table of centimeters and inches, and liters and pints; a table showing number of square feet in any length and width of screen wire cloth, and others of equal convenience for reference. The book also contains a map of the downtown district of Chicago, in which the location of railway stations, hotels, theaters and prominent buildings are included. This special want book is being sent out along with shipments of goods ordered by customers.

F. E. Myers & Bro.'s New Catalogue.

F. E. MYERS & BRO., Ashland, Ohio, are distributing their new catalogue containing over 300 pages, illustrating with price-lists and descriptions Double Acting Force and Lift Pumps, Hand, Windmill, Power, Hydraulic, Barrel and Bucket Spray Pumps; Hay Unloaders, Forks, Steel Tracks, Pulleys, Slings, &c.; Cylinders, Pipe, Hose, Atomizers, Fixtures, Door Hangers, Gate Hangers, Store Ladders, Bicycle Stands, Hay Rack Clamps, &c. The products of the company include all goods shown in the catalogue with the exception of a few articles in the way of Pipe Tools, &c. The catalogue list prices cancel all former ones, and one discount applies to all Pump and Cylinder lists, enabling merchants to arrive at net figures without further correspondence.

Razor Insurance.

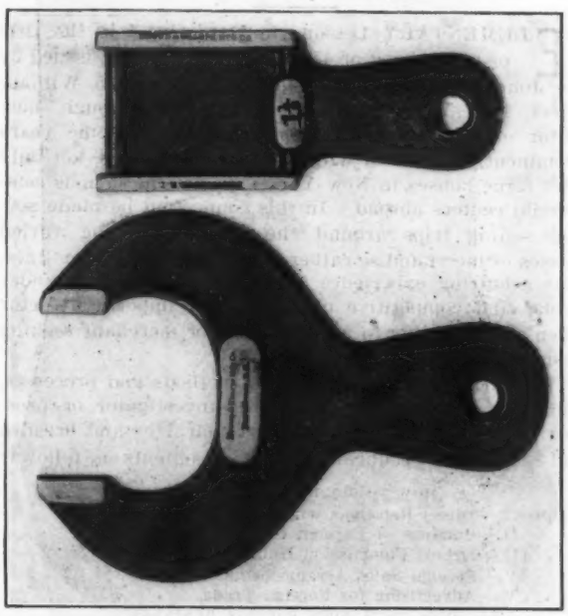
The Randall & Robinson Company, Marbridge Building, Broadway and Thirty-fourth street, New York City, is putting on the market what is termed Razor Insurance, the chief feature of which is the R. & R. compound. This is a little block of a special chemical combination somewhat resembling a piece of soap. It is rubbed into the canvas side of a razor strop until the compound has been evenly spread on the surface, after which it is thoroughly worked into the fiber by means of the smoothing block which goes with each outfit. The next step is to apply the special oil furnished to the leather side of the strop, this giving excellent finishing qualities. After the strop has thus been prepared with compound and oil it is ready for the razor. Special claims are made for the efficiency of this compound in putting the right edge on a dull razor and keeping a perfect edge on a sharp razor. The compound is neatly put up in a box, which also contains a small bottle of oil, smoothing block and a piece of gauze for cleaning the strop, together with a booklet entitled "The Art of Shaving Correctly," in which some excellent suggestions are given. A card also goes with the outfit, which is intended to be filled out with the name and address of the buyer and the date of purchase, which is to be returned to the company. This is in connection with the guarantee of the company to keep the buyer supplied with Razor Insurance for a period of two years. In other words, if at any time during the two year period a further supply of the compound or oil is desired the company will be pleased to furnish it without additional charge.

Carded Brushes.

The United Brush Manufactories, 21-23 Park place, New York, with main works at Nuremberg, Germany, known as Vereingte Pinsel Fabriken, have just put on the market an attractively displayed line of fine quality brushes in carded goods, particularly well adapted for the hardware and allied trades. One group which may be very profitably retailed at 10 cents each is on hanging display cards, printed in color, 12 brushes on a card. One is the Windsor, of high grade camel's-hair, flat, 1 in. wide, basswood handles, for varnish. The Perfection designates a brush for artists and enameling, oval nickled ferrules and handles enameled light green. The Monarch is supplied in both black goat hair and white bristle brush, round nickeled ferrules and red enameled handles, handy for paint, household use or enameling. Still another line similarly put up for hanging display, 24 brushes to the card, may be retailed at 5 cents each at a handsome profit. These are branded superior and are camel'shair artists' brushes, smaller handle and a wide assortment of sizes, graded from small to large. The handles on each card are solidly red, green or natural finish, according to preference. The Rubens, artist brush, is *de luxe* in character, put up in hinged cover boxes in light green tint, with the brushes on separate card inside. The bristles are white hog hair of finest selected grade, seamless nickeled ferrules, round polished handles, enameled in yellow, assorted sizes, round and flat, long and short bristles.

Standard Caliper Gauges.

Standard caliper gauges of the type represented herewith are desirable where measurements of one kind only, either internal or external, are to be taken and where the combined internal and external gauge usually employed is not necessary. In many cases, however, both are furnished, although only one is used in gauging, the other being employed in testing its mate. They are made in sizes from ¼ to 3 in., ascending in sixteenths, by the Brown & Sharpe Mfg. Company, Providence, R. I.



Standard Caliper Gauges.

Goulds Safety Lift and Force Oil Pump.

For handling gasoline, kerosene and other oils with economy and safety the Goulds Mfg. Company, Seneca Falls, N. Y., is introducing the pump shown herewith. The pump can be mounted upon barrel or tank, and if desired can be arranged to pump oil from tank in basement or from underground storage, thereby insuring absolute safety from explosion and evaporation. The cylinder is arranged with trip valve at the bottom, making it possible entirely to drain the pump and piping of gasoline or oil by simply raising the lever to its highest point, thus allowing the oil to syphon back into the tank or reservoir, insuring absolute safety from explosions. With this arrangement the oil is conducted through pipes or hose if desired direct to automobile or launch tank, avoiding any undue waste. The spout is arranged for hose connections. The plunger rod is polished steel working through a brass stuffing box. The lever may be operated by the left hand, leaving the right hand free to control the measuring tank, gauges, &c. The spout is reversible, so that the liquid may be discharged at either right or left of the pump, the change being made by simply removing the lever and turning the spout either way. The pump is referred to as compact, strong and durable, and as moderate in price.

Goulds Safety Lift and Force Oil Pump, for Handling Gasoline, Kerosene and Other Oils.

The Standard Steel Bottomless Soda Case.

The Standard Steel Box Company, Rankin, Pa., is offering the bottomless case shown in the accompanying illustrations, for soda, pop, mineral waters and all beverages put up in splits. The most noticeable feature of the

Fig. 1.—Standard Steel Bottomless Soda Case, for Soda, Pop, Mineral Waters and All Beverages Put Up in Splits.

case is the strength and rigidity of its frame. All sides or corners which may be subjected to severe strains or blows are reinforced with angle, channel or T bar construction, and this is accomplished by means of folded seams instead of riveting. Wherever protection is needed

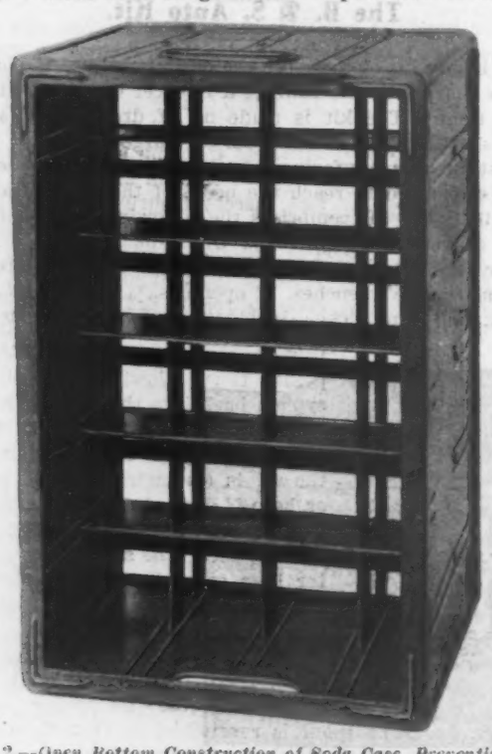
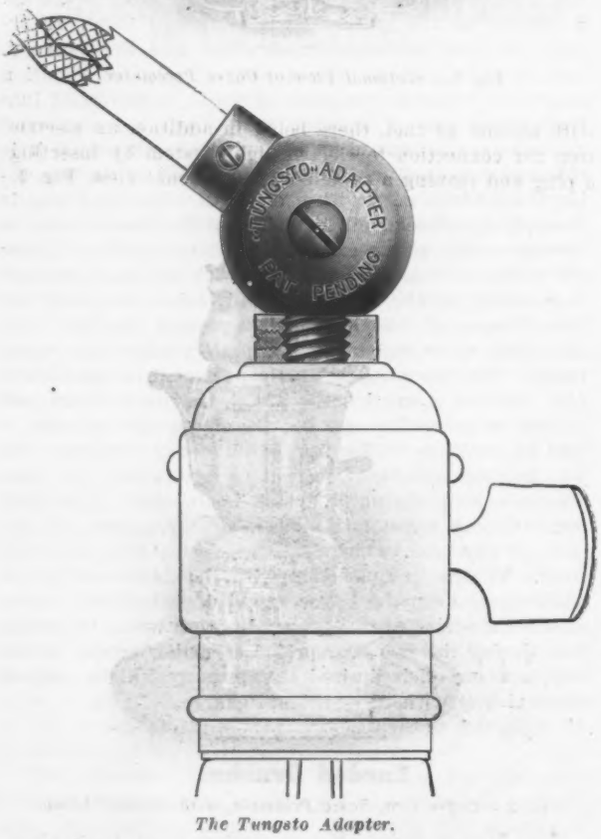


Fig. 2.—Open Bottom Construction of Soda Case, Preventing Its Use as an Ash or Garbage Can.

in the sheet sides, tops or bottoms there are ribs or bosses drawn in the metal itself, thereby strengthening the sheet as well as forming protective cushions for the bottles. The point is made that the cases weigh the same as the reinforced dry wood cases and about 20 per cent. less than wet wood cases. A feature that will appeal to the consumer is the neat appearance and the clean, sanitary surfaces. The attention of the bottler is called to the fact that steel cases need practically no repairs and are extremely durable; that at a slight cost they can be painted, thus insuring almost indefinite life, and that the open bottom construction does not permit their being used as ash or garbage cans.

The Tungsto Adapter.

The Frank Mossberg Company, Attleboro, Mass., is offering the Tungsto adapter, shown herewith. The company states that the Tungsten electric lamp, on account of its construction, should be hung with the large end of the bulb pointing downward; also that many lamp fixtures are so made that, while an ordinary incandescent lamp may be used without trouble, the Tungsten lamp, if applied direct to the fixture, would rapidly deteriorate and ultimately become useless through the breaking of



The Tungsto Adapter.

the delicate filament. It is explained that by the use of the adapter, the Tungsten lamp may be used with any style fixture, the lamp being held rigidly in the proper position. The device permits instant adjustment of the lamp without distortion or bending of the lamp fixture, and is referred to as presenting a neat and ornamental appearance when in position. The adapter is finished in old brass, polished brass, nickel plate and oxidized copper to suit the requirements of users.

The Union Revolving Jaw Chuck.

The Union Mfg. Company, New Britain, Conn., is calling attention to its revolving jaw chuck as adapted to use in connection with automobile and motor boat work. The chuck is desirable for holding work where the faces to be machined have regular angles to each other. The varieties of work for which the chuck has been adapted are many, including valves, pipe fittings and machine parts, but particularly for automobile and small engine parts. The jaws revolve on ball bearings, reducing the friction and allowing the work to be revolved without loosening the main jaws. This is referred to as a great advantage, as it assures the operator that the machined faces will always maintain the same angle to each other. The chuck is made in six sizes, with jaws opening from 2½ to 10 in.

Automatic Coffee Percolators.

The American Silver Company, Bristol, Conn., is offering the American automatic coffee filter or percolator for any kind of stove or range, and also for operation

Fig. 1.—Sectional View of Coffee Percolator.

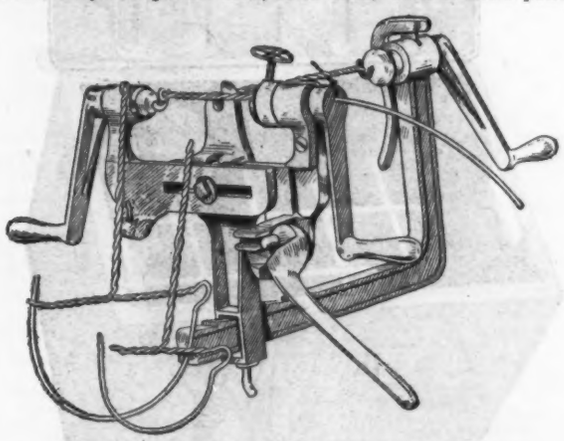
with alcohol as fuel, there being in addition an electric iron for connection to electric light system by inserting a plug and turning a switch. The sectional view, Fig. 1,

Fig. 2.—Coffee Urn, Same Principle, with Alcohol Lamp.

illustrates the principle and details of construction. Coffee, medium ground, is placed in the upper receptacle, and as the heat warms the water in the small area of the well it rises in the tube, the colder water being heated in turn and rising until the whole mass is circulating at about one temperature. As the fluid rises in the tube it is sprayed over the ground berry automatically, thus extracting the essence of the coffee and preserving the aroma, yet not releasing the astringent tannin, as in boiling. The upper compartment, glass cap and tube are instantly removable for cleansing. Circulation begins at a temperature under 100 degrees F., and when the infusion reaches a temperature of 170 to 180 degrees, the beverage is ready to serve. The capacities range from 1½ to 4 pints, the material used being copper, in nickeled, silver plated and copper finishes.

The Gibbs Improved Wire Hanger Machine.

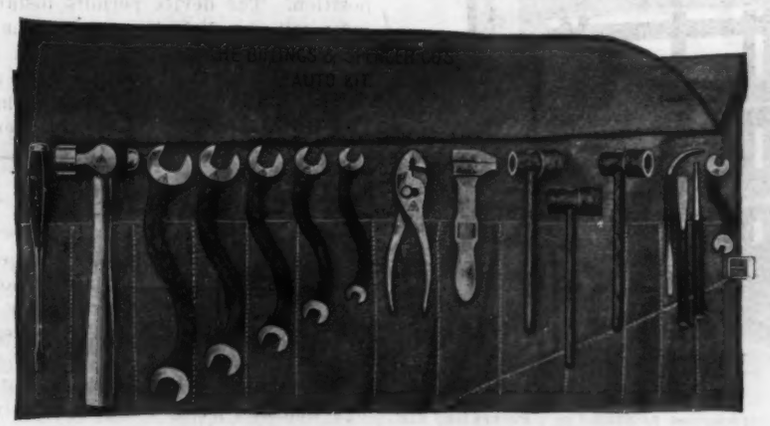
The Gibbs Mfg. Company, Princeton, Ill., is offering the hand machine here illustrated for making eave trough hangers of all sizes from 3½ to 8 in. wide and seven different lengths, using any size wire adapted to the work. The machine is referred to as substantially made, easy to operate and, it is said, with a little practice a man or boy can make the hangers about as rapidly as the large power machines. An idea of the economy of the machine may be gathered from the company's statement that 100 lb. of No. 11 galvanized wire will make 7½ gross of 4-in. hangers at a saving of two-thirds in the cost of the hangers.



The Gibbs Improved Wire Hanger Machine.

The B. & S. Auto Kit.

A handy kit of tools for use on automobiles is placed on the market by the Billings & Spencer Company, Hartford, Conn. The kit is made up of drop forged steel tools exclusively, selected from the large variety of machinists' tools manufactured by the company. The selection is designed to reach the needs of the average automobilist. The kit comprises the following tools, put up in a canvas bag, as shown: One 9-in. all steel screw driver, one 8-oz. ball bearing hammer, six full finished general service wrenches, 12 openings, ¼ to 15-16 in., by 16ths; one 6-in. nickel combination plier, one model D nickel wrench, three double end socket wrenches, six openings, ⅜ to ⅞ in., hexagon; one cotter pin tool, one ⅜-in. cold chisel, one punch.



The B. & S. Auto Kit.

Louden's Iowa Sling Carrier.

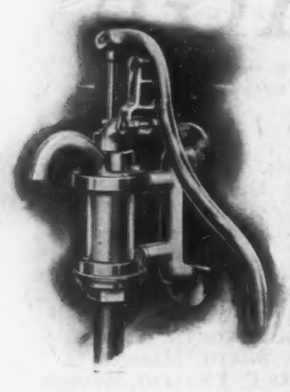
Included in the line of agricultural machinery made by the Louden Machinery Company, Fairfield, Iowa, is the sling hay carrier, here illustrated. It is designed for heavy loads and hard service, being strongly built throughout. It is fitted with two four-wheel oscillating trucks, but is supplied with four instead of eight wheels if desired. Its locking mechanism is at once simple and effective; while so constructed as to afford a secure grip,

Louden's Iowa Sling Carrier.

the surfaces in contact with the rope are made smooth to prevent its abrasion. The carrier is rigged with either parallel or right angle pulleys, triple draft, the latter form being shown in the illustration. It is also both a swivel and reversible carrier, operating right or left, so that hay from a driveway may be run in either direction or may be taken from one or both ends of the barn. The swivel is of extra strong steel and thoroughly braced, and the trucks are rigidly constructed to guard against spreading and slipping off the track under heavy loads.

The Hartley Bracket Pump No. 451.

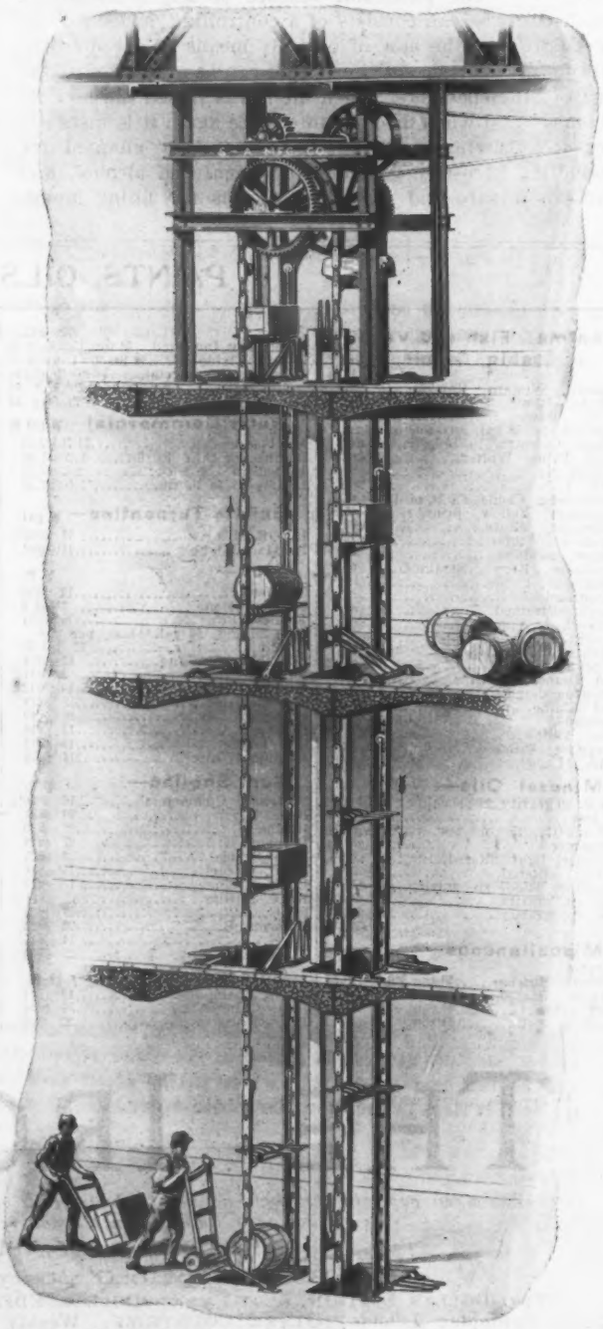
A bracket pump of novel design, the general style of which is presented in the accompanying illustration, has been brought out by the C. J. Hartley Company, Decatur, Ill. Being made for attachment to the wall by means of a bracket, the pump requires no brace, and is therefore convenient for use in connection with roll rimmed sinks. The head is universally adjustable with the barrel, and the handle may be likewise shifted to any desired position. These provisions facilitate the installation of the pump in places where it would be otherwise difficult, if not impossible, to operate them. They are made in two styles, Nos. 451 and 454, the former being the one shown. No. 454 differs from this style only in the head, which is fitted with the bibb cock instead of a spout, having in addition an opening on the top of the head for attachment to a 1-in. pipe so that water can be forced to an upper story. Unless the latter feature is desired, No. 451 is recommended as more desirable for general service. The pump is fitted with brass barrel, brass plunger rod, brass stuffing box and brass valve seat. The head is fitted to the barrel with a ground joint requiring no gasket. The pumps are attractively finished in aluminum and polished brass.



The Hartley Bracket Pump No. 451.

The Automatic Package and Barrel Elevator.

The elevator shown herewith is designed for general service in stores and warehouses where many packages in the form of barrels, cases, crates, &c., are handled. Among the advantages claimed for the machine by the maker, the Stephens-Adamson Mfg. Company, Aurora, Ill., are that it is a great labor saver, and that it is inexpensive to operate or maintain. The carriers are hung centrally between the link elevator chains, to which they are pivotally attached, so that they maintain the same position at any point of the chain circuit. The carrier platforms consist of cast iron fingers projecting laterally from the center. Automatic unloading of the carrier is effected by double leafed gates on each floor, one part being hinged to a pair of posts set between the floor openings, the other being attached to the floor. The fingers of the gates alternate with those of the carrier,



The Automatic Package and Barrel Elevator.

and when thrown forward automatically lift the load from the carrier and skid it to the floor. The unloading gates on any given floor can be operated from any other floor. The sprocket wheels carrying the chains are gear driven and may be run constantly, since the load is automatically picked up at any floor. If no gates are set for its removal the load is simply carried around the circuit until the gates are set to take it off.

Bumann's Easy Flow Oil Can.

The accompanying illustration shows a new oil can manufactured by the Bumann Mfg. Company, Litchfield, Ill. The particular feature of improvement embodied in the can consists of a controlling device for the regulation of the flow of oil. By means of a rod in the filling tube the size of the stream can be graduated at the will of the operator. When the rod is raised the flow increases, and when dropped into place again it is instantly cut off, leaving no drip. It is especially adapted for handling kerosene, gasoline and denatured alcohol, and affords a safe and convenient means for filling lamps, bottles and tanks of automobiles. The can is made of galvanized iron, and, being tight, evaporation of its contents is prevented. It is made in 2, 3, 5 and 10 gal. sizes,

Bumann's Easy Flow Oil Can.

of which the first three are put in up one-half dozen crates and the large size one-quarter dozen crates.

PAINTS, OILS AND COLORS

Animal, Fish and Vegetable Oils—

	₱ gal. bbl. lots
Linseed, Western, Raw	.58 @59
State, Raw	.58 @69
City, Raw	.59 @60
Boiled, 1¢ ₱ gal. advance on Raw.	
Raw, Calcutta, in bbls	.75 @..
Lard, Prime Winter	.82 @83
Extra No. 1	.52 @53
No. 1	.47 @49
Cotton-seed, Crude, f.o.b. mill	4.60@4.67
Summer, Yellow, prime	5.75@5.80
Summer, White	6.10@6.12
Yellow, Winter	6.10@6.12
Tallow, Acidless	.56 @..
Menhaden, Brown, Strained	.33 @..
Northern, Crude	@..
Southern	.24 @25
Light Strained	.33 @..
Bleached Winter	.56 @..
Extra Bleached Winter	.58 @..
Cocoanut, Ceylon ₱ lb	7½@..
Cochin ₱ lb	7.15@7.25
Cod, Domestic, Prime	.38 @..
Newfoundland	.40 @..
Red Elaine	.43 @47
Saponified ₱ lb	5½@ 6¾
Olive, Yellow	1.40@1.50
Neatsfoot, Prime	.55 @56
Palm, Lagos ₱ lb	5.55@5.60

Mineral Oils—

	₱ gal.
Black, 29 gravity, 25@30 cold test	12½@13
29 gravity, 15 cold test	13½@13½
Summer	12 @12½
Cylinder, light filtered	20 @20½
Dark, filtered	17½@18
Paraffine, 903-907 sp. gravity	14 @14½
903 sp. gravity	13 @13½
883 sp. gravity	10½@11
Red	13 @13½

Miscellaneous—

Barytes:	
White, Foreign ₱ ton	$18.50@20.50
Amer., floated ₱ ton	17.00@18.00
Off color ₱ ton	12.50@15.00
Chalk in bulk ₱ ton	3.00@ 3.10

	₱ gal.
China Clay, Imported ₱ ton	11.50@18.00
Cobalt, Oxide ₱ 100 lb	1.45@ 2.60
Whiting, Commercial ₱ 100 lb	45@50
Gilders ₱ 100 lb	.52@ .64
Ex. Gilders ₱ 100 lb	.56@ .68

Putty, Commercial— ₱ 100 lb

In bladders	$1.70@2.00
In bbls. or tubs, 100 lb	1.20@1.45
In 1 lb to 5 lb tins	2.65@3.25
In 12½ to 50 lb tins	1.50@1.90

Spirits Turpentine— ₱ gal.

In Oil bbls	41 @41½
In Machine bbls	41½@42

Glue— ₱ lb

Cabinet	.12 @15
Common Bone	7½@ 9
Extra White	.18 @24
Fish, liquid, 50 gal. bbls., per gallon	.60 @1.20
Foot Stock, White	.12 @14
Foot Stock, Brown	9 @11
German Common Hide	.10 @12
German Hide	.12 @13
French	.10 @40
Irish	.13 @16
Low Grade	.10 @12
Medium White	.14 @19

Gum Shellac— ₱ lb

Bleached, Commercial	.16 @16½
Bone Dry	.20 @21
Button	.20 @30
Diamond I	.27 @28
Fine Orange	.20 @21
A. C. Garnet	15½@16
Light Orange	.17 @19
Kala Button	.10 @11
D. C	.27 @28
Octagon B	.22 @23
T. N	.14 @15
V. S. O	.25 @26

Colors in Oil— ₱ lb

Black, Lampblack	.12 @14
Blue, Chinese	.36 @46
Blue, Prussian	.32 @36
Blue, Ultramarine	.13 @16
Brown, Vandyke	.11 @14
Green, Chrome	.12 @16
Green, Paris	@24
Sienna, Raw	.12 @15
Sienna, Burnt	.12 @15
Umber, Raw	.11 @14
Umber, Burnt	.11 @14

White and Red, Lead &c.— ₱ lb

Lead, English white, in Oil	10½@10¾
Lead, American White:	
Dry and in Oil, 100, 250 and 500 lb kegs	6¾
Dry and in Oil, 25 and 50 lb kegs	7
Dry and in Oil, 12½ lb kegs	7¼
In Oil, 25 lb tin pails	7¼
In Oil, 12½ lb tin pails	7¾
In Oil, 1, 2, 3 and 5 lb tin cans, ass't	8¾
Red Lead and Litharge:	
In 100 lb kegs	7
In 25 and 50 lb kegs	7¼
In 12½ lb kegs	7½
In lots of less than 500 lbs. ½¢ ₱ lb advance over above prices of White and Red Lead and Litharge	
Lead, American. Terms: On lots of 500 lbs and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.	

Zinc, Dry— ₱ lb

American, dry	5¼@ 5¾
Red Seal (French process)	6¾@ 7
Green Seal	7¼@ 7½
German Red Seal (French process)	7⅛@ 7¾
Green Seal	7⅝@ 8
White Seal	8⅜@ 9
French, Red Seal	8¾@ 8¾
Green Seal	10⅜@10⅝

Dry Colors— ₱ lb

Black, Carbon	.7 @10
Black Drop, American	3½@ 8
Black Drop, English	.5 @15
Black, Ivory	.16 @20
Lamp, commercial	.3 @ 5
Blue, Celestial	.4 @ 6
Blue, Chinese	.30 @31
Blue, Prussian, Domestic	.28 @30
Blue, Ultramarine	.5 @15
Brown, Spanish	⅛@ 1
Carmine, No. 40	$2.75@$2.85
Green, Chrome, ordinary	3½@ 5
Green, Chrome, pure	.17 @25
Metallic Paint, Brown, ₱ ton	$16.50@$22.00
Red, ₱ ton	$14.00@18.00
Ocher, American ₱ ton	$12.00@15.00
American Golden	4 @ 5
French	1¾@ 2
Foreign Golden	3 @ 4
Orange Mineral, English	11 @12
French	12¾@13
German	12 @13
American	8½@10
Red, Indian, English	5 @ 7
American	3 @ 3¼
Red, Turkey, English	4 @10
Red, Tuscan, English	7 @10
Red, Venetian, Amer. ₱ 100 lb	$0.75@1.50
English ₱ 100 lb	$1.15@1.60
Sienna, Italian, Burnt and Powdered	.3 @ 9
Italian, Raw, Powdered	.3 @ 7
American, Raw	2½@ 3
American Burnt and Pow'd	.2¼@ 3
Talc, French ₱ ton	$18.00@25.00
American ₱ ton	15.00@25.00
Terra Alba, French ₱ 100 lb	.80@1.00
English ₱ 100 lb	.90@1.00
American ₱ 100 lb, No. 1	.75@ .80
American ₱ 100 lb, No. 2	.60@ .65
Umber, Turkey, Bnt. & Pow.	2½@ 3
Turkey, Raw and Powdered	2½@ 3
Burnt, American	2 @2½
Raw, American	2 @ 2½
Yellow, Chrome, Pure	12¼@13
Oxide Red, American	2 @ 7½
Vermilion, English, Imported	@70
Chinese	$0.90@1.00

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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Current Hardware Prices.

General Goods.—Goods which are made by more than one manufacturer are printed in *Italics*. The prices named represent those obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are usually given to larger buyers.

Special Goods.—Quotations printed in small type (Roman) relate to goods of particular manufacturers, who request the publication of the prices named and are responsible for their correctness. They usually represent the prices to the small trade, lower prices being generally obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓ @ 33⅓ & 10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued annually, a book of 376 pages, which is sent free of charge to every subscriber to *The Iron Age*. It gives a classified list of the products of our advertisers and thus serves as an up-to-date DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—"The Iron Age Standard Hardware Lists," 218 pages, price $2, prepaid, contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters, Blind—
Columbian and Domestic....33⅓%
North's....10%
Upson's Patent, ₩ gro., $29.90....10%
Zimmerman's—See Fasteners, Blind.

Window Stop—
Ives' Patent....10%
Ives' Stop Bead Screws and Washers....10%
Taplin's Perfection....10%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anti—Rattlers—
Fernald Mfg. Co. Burton Anti-Rattlers, ₩ doz. pairs, Nos. 1, $0.75; 2, $0.00; 4, $1.00; 5, $0.50.
Fernald Quick Shifter, ₩ doz. pairs....$2.00@$3.00

Anvils—American—
Eagle Anvils....₩ lb @9¢
Hay-Budden, Wrought....9½@9¾¢
Trenton....₩ lb 9½@9¾¢

Imported—
Swedish Solid Steel Paragon, ₩ lb....10@10½¢
Swedish Solid Steel Sisco, Superior, ₩ lb....10@10½¢
Peter Wright & Sons, ₩ lb, 81 to 349 lb, 11¢; 350 to 600 lb, 11½¢.

Anvil, Vice and Drill—
Millers Falls Co., $18.00....15&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Livingston Nail Co....10%

Augers and Bits—
Com. Double Spur....80%
Jennings' Patn., Bright....65&10@70%
Black Lip or Blued....65@65&5%
Boring Mach. Augers....70%
Car Bits, 12-in. twist....40&10%
Ford's Auger and Car Bits....40&5%
Ft. Washington Auger Co., Conard's....25%
Forstner Pat. Auger Bits....25%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jenulngs' list, 25&7½%
No. 30, R. Jennings' list....50%
Russell Jennings'....25&10&2½%
L'Hommedieu Car Bits....15%
Mayhew's Countersink Bits....45%
Pugh's Black....20%
Pugh's Jennings' Pattern....35%
Snell's Auger Bits....60%
Snell's Bell Hangers' Bits....60%
Snell's Car Bits, 12-in. twist....40%
Snell's King Auger Bits....50%
Snell's Star Auger Bits....50&10%
Swan's....50%
Swan's, Jennings' Pattern....50%
Wright's Jennings' Bits....50%

Bit Stock Drills—
See *Drills, Twist.*

Expansive Bits—
Clark's Pattern, No. 1, ₩ doz., $26; No. 2, $18....60&10%
Ford's, Clark's Pattern....60&5&60&10%
C. E. Jennings & Co., Steer's Pat..25%
Lavigne Pat., small size, $18.00; large size, $26.00....60&10%
Swan's....60%

Gimlet Bits—
Per gro.
Common Dbl. Cut....*$3.00@3.25*
German Pattern, Nos. 1 to 10, $4.75; 11 to 13, $5.75

Hollow Augers—
Bonney Pat., per doz...*$5.50@6.00*
Ames....20&10%
Universal....20%

Ship Augers and Bits—
Ship Augers....*40&10@—%*
Ford's....33⅓&5%
C. E. Jennings & Co.:
L'Hommedieu's....6%
Watrous'....33⅓&7½%
Snell's....18%

Awl Hafts—See *Handles, Mechanics' Tool.*

Awls—
Brad Awls:
Handled....*gro. $2.75@3.00*
Unhdled, Shldered...*gro.63@66¢*
Unhandled, Patent..*gro.66@70¢*
Peg Awls:
Unhandled, Patent..*gro. 31@34¢*
Unhdled, Shldered..*gro. 65@70¢*
Scratch Awls:
Handled, Com...*gro. $3.50@4.00*
Handled, Rocket..*gro.$11.50@12.00*
Elmore Tool Mfg. Co.:
Tinners' and Brad Awls....55&7%
Scratch Awls....60%

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—
Single Bit, base weights: Per doz.
First Quality....$4.75@5.00
Second Quality....$4.25@4.50
Double Bit, base weights:
First Quality....$7.00@7.50
Second Quality....$6.50@6.75

Axle Grease—
See *Grease, Axle.*

Axles—Iron or Steel.
Concord, Loose Collar....4¼@4½¢
Concord, Solid Collar....4½@5 ¢
No. 1 Common, Loose....3½@4 ¢
No. 1½ Com., New Style..4¼@4¾¢
No. 2 Solid Collar....4¼@4¾¢
Half Patent:
Nos. 7, 8, 11 and 12....70%
Nos. 13 to 14....70%
Nos. 15 to 18...70&10@70&10&5%
Nos. 19 to 22...70&10@70&10&5%

Boxes, Axles—
Common and Concord, not turned....*lb., 5@6¢*
Common and Concord, turned, lb., 6@7¢
Half Patent....*lb., 9½@10¢*

Bait—Fishing—
Hendryx:
A Bait....20%
B Bait....25%
Competitor Bait....20&5%

Balances—Sash—
Caldwell new list....10&10%
Pullman....50&10%

Spring—
Light Spring Balances..*60@60&5%*
Chatillon's:
Light Spg. Balances....50@50&10%
Straight Balances....40@40&10%
Circular Balances....50&10%
Large Dial....30%

Barb Wire—See *Wire, Barb.*

Bars—Crow—
Steel Crowbars, 10 to 40 lb.... per lb., 2¼@2½¢

Towel—
No. 10 Ideal, Nickel Plate..₩ gro. $8.50

Beam, Scale—
Scale Beams....40%
Chattilloh's No. 1....30%
Chatillon's No. 2....40%

Beaters, Carpet—
Holt-Lyon Co.:
No. 12 Wire Coppered ₩ doz, $0.80; Tinned....$0.85
No. 11 Wire Coppered ₩ doz. $1.15; Tinned....$1.29
No. 10 Wire Tinned....₩ doz. $1.50

Beaters Egg—
Dover Stamping & Mfg. Co.:
Genuine Dover, per gro., No. 1, Tumbler Size, $7.50; No. 2, Family Size, $7.50; No. 3 Extra Family Size, $21.00; No. 4, Hotel Size, $36.00.
Holt-Lyon Co.:
Holt, per doz., No. 5, Jap'd, $0.80; No. A, Jap'd, $1.15; No. B, Jap'd, $1.85; No. 6, Jap'd, $1.65.
Lyon, Jap'd, per doz., No. 2, $1.35.
Taplin Mfg. Co.:
Improved Dover, per gro., No. 60, $6.00; No. 75, $6.50; No. 100, $7.00; No. 102, Tin'd, $8.50; No. 150, Hotel, $15.00; No. 152, Hotel Tin'd, $17.00; No. 200, Tumbler, $8.50; No. 202, Tumbler Tin'd, $9.50; No. 300, Mammoth, per doz., $25.00.

Bellows—
Blacksmith, Standard List:
Split Leather....60&10@65%
Grain Leather....50@50&10%

Net Prices

Hand—					
Inch..	*6*	*7*	*8*	*9*	*10*
Doz..	*$5.00*	*5.50*	*6.00*	*6.50*	*7.50*
Molders—					
Inch..	*10*	*12*	*14*	*16*	
Doz..	*$7.50*	*9.00*	*12.00*	*15.00*	

Bells—Cow—
Wrought Cow Bells....75%
Jersey....75&10%
Texas Star....50%

Door—
Home, R. & E. Mfg. Co.'s....55&10%

Hand—
Polished, Brass....60@60&10%
White Metal....60@60&10%
Nickel Plated....50&10%
Swiss....50&10%
Coue's Globe Hand Bells....33⅓@33⅓%

Miscellaneous—
Farm Bells....*lb., 2¼@2½¢*
Church and School....60@60&10%

Belting—Leather—
First Quality, Ex. Hy., Strictly Short Lap....60&10%
Standard....70&10@70&10&5%
Light Double....75&10%
Cut Leather Lacing....45@50%
Leather Lacing Sides, per sq. ft.25¢

Rubber—
Competition (Low Grade)....70&10@75%
Standard....60&10@70%
Best Grades....40@50%

Bench Stops—
See *Stops, Bench*

Benders and Upsetters, Tire—
Green River Tire Benders and Upsetters....20%

Bicycle Goods—
John S. Leng's Son & Co.'s 1908 list:
Chain, Parts, spokes....50%
Tubes....60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Blocks Tackle—
Common Wooden....75@75&10%
B. & L. B. Co.:
Boston Wood Snatch, 50%; Eclipse Steel, 75%; Hollow Steel, 50&10%; Star Wire Rope, 50%; Tarbox Metal Snatch, 50%; Tarbox New Style Steel, 50&10%; Wire Rope Snatch, 50%.
Lane's Patent Automatic Lock and Junior....30%
See also Machines, Hoisting.

Boards, Stove—
Paper and Wood Lined....55%
Embossed....55%

Boards, Wash—
See *Washboards.*

Bobs, Plumb—
Keuffel & Esser Co....33⅓&10%

Bolts Carriage, Machine, &c.—
Common Carriage (cut thread): ⅝ x 6 and smaller....75&10%
Larger and longer....70&10%
Common Carriage (rolled thread): ⅝ x 6, smaller and shorter, 75&10&5%
Phila. Eagle, $3.00 list..80@—%
Bolt Ends, with C. & T. Nuts, 70&10%
Machine (Cut Thread):
⅜ x ¼ and smaller....75&10&5%
Larger and longer....70&10&5%

Door and Shutter—
Cast Iron Barrel, Japanned, Round Brass Knobs:

Inch	*3*	*4*	*5*	*6*	*8*
Per doz..	*$0.30*	*.35*	*.45*	*.60*	*.80*

Cast Iron Spring Foot, Jap'd:

Inch	*6*	*8*	*10*
Per doz.	*$1.20*	*1.50*	*2.25*

Cast Iron Chain, Flat, Japanned:

Inch	*6*	*8*	*10*
Per doz.	*$1.00*	*1.40*	*1.65*

Cast Iron Flat Shutter, Jap'd, Brass Knobs:

Inch	*6*	*8*	*10*
Per doz.	*$0.75*	*.95*	*1.25*

Wrought Barrel Japanned. 80&10@80&10&5%
Barrel Bronzed....60&10%
Spring....70&10@70&10&10%
Shutter....50&5@50&10&5%
Square Neck....75@75&10%
Square....70&10&10@80%
Ives' Mortise....10%
Ives' Wrought Metal....10%

Expansion—
F. H. Evans' Crescent....10@10%
Richards Mfg. Co....55&10%
Star Expansion Bolt Co.:
Star, Lag Screw Type..60&10&5&2½%
Star, Wood Screw Type....40%
Star, Machine, Single Wedge....60%
Star, Machine, Double Wedge..60@10%
Steward & Rogers Mfg. Co.:
Style No. 13, Double....60%
Style No. 1, Single....60%
Style No. 100, Dbl. Jaw, Single..55%
Lag Screw....66⅔%

Plow and Stove—
Plow....65&5@70%
Stove....85@85&5%

Tire—
Common Iron....80%
Norway Iron....80%
American Screw Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84..82½%
Bay State, list Dec. 28, '99....80%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84...80%
Eagle Phila., list Oct. 16, '84..82½%
Eclipse, list Dec. 28, '99....80%
Russell, Burdsall & Ward Bolt & Nut Co.:
Empire, list Dec. 28, '99....80%
Norway Phila., list Oct. '84....80%
Eagle....82½%
Shelton Co.:
Tiger Brand, list Dec. 28, '99...80%
Phila. Eagle, list Oct. 16, 1884..82½%
Upson Nut Co.:
Tire Bolts....72½%

Borers, Bung—
Borers Bung, Ring, with Handle:

Inch	*1¼*	*1½*	*1¾*	*2*
Per doz.	*$4.80*	*5.60*	*6.40*	*8.00*
Inch			*2¼*	*2½*
Per doz			*$8.65*	*11.50*

Enterprise Mfg. Co., No. 1, $1.25; No. 2, $1.75; No. 3, $2.50 each....25%

Boxes, Mitre—
C. E. Jennings & Co....25%
Langdon, New Langdon and Langdon Improved, 20&10%; Langdon Acme....15&10%
Perfection....40%
Seavey....45%

Braces—
Common Ball....*$1.50@$1.75*
Barber's....50&10&10@60&10%
Fray's Genuine Spofford's....60%
Fray's No. 61, 166, 206, 614....50%
C. E. Jennings & Co....50&5%
Mayhew's Ratchet....60%
Mayhew's Quick Action Hay Pat...50%
Millers Falls Drill Braces....25&10%
P., S. & W. Co., Peck's Pat....60&10%

Brackets—
Wrought Steel....80@80&5%
Bradley Metal Clasp..80&10@80&10&5%
Griffin's Pressed Steel....75@75&10%
Griffin's Folding Brackets....70&10%
Stanley's Pressed Steel....80%
Stanley's Folding Brackets..70&10&5%
Taplin Victor Handy Egg Beater Bracket....₩ doz, $1.50

Bright Wire Goods—
See *Wire and Wire Goods.*

Broilers—
Kilbourne Mfg. Co....75&20%
Wire Goods Co....75%

Buckets, Galvanized—
M'fr's list, price per gross.

Quart..	*10*	*12*	*14*
Water, Light	*$28.35*	*30.75*	*34.75*
Water, Ex. Hvy.	*46.85*	*49.35*	*53.25*
Fire, Rd. Btm.	*33.50*	*35.90*	*39.90*
Well....*37.35*	*41.35*	*45.35*	

10&7½&5&5%

Bull Rings—See *Rings, Bull.*

Butts—Brass—
Wrought....65%
Cast Brass, Tiebout's....40&10%

Cast Iron—
Fast Joint, Broad....40&10@50%
Fast Joint, Narrow...40&10@50%
Loose Joint....70&10&75%
Loose Pin....70&10@75%
Mayer's Hinges....70@70&5
Parliament Butts....70@70&5

Wrought Steel—
BRIGHT.
Light Narrow, Light Reversible....75&5%
Reversible and Broad.75&10%
Loose Joint, Narrow, Light Inside Blind, &c.....75%
Back Flaps, Table Chest.70%
BRONZED.
Light Narrow, Loose Pin..55%
Light, Loose Pin, Ball Tip.65%
Broad....55%

Extra, 5@—

Cages, Bird—

Hendryx Brass: Series 3000, 5000, 1100, net list; 1200, 15%; 200, 300, 900 ..... 30%
Hendryx Bronze: Series 700, 800....30%
Hendryx Enameled..... 35%

Calipers—See *Compasses.*

Calks, Toe and Heel—

Blunt, 1 prong, per 100 lb., $3.50@$3.85
Sharp, 1 prong, per 100 lb., $4.00@$4.35
Burke's, 1 pg. Blunt Toe, 3¾¢; 2 pg. Blunt Toe, 4¼¢; 1 pg. Sharp Toe, 4¼¢; 2 pg. Sharp, 4¾¢; Blunt Heel, 4¼¢; Sharp Heel.....4¾¢
Lautier, Blunt, 4@4¼¢; Sharp, 4½@4¾¢
Perkins', Blunt, ℔ lb, 3.65¢; Sharp, 4.15¢

Can Openers—

See *Openers, Can.*

Caps, Percussion—

Eley's E. B.....52@55¢
G. D.....per M. 34@35¢
F. L.....per M. 40@42¢
G. E.....per M. 48@50¢
Musket .....per M. 62@63¢

Primers—

Berdan Primers, $2 per M. 20&5%
Primer Shells and Bullets..15&10%
All other primers per M. $1.52@1.60

Carpet Stretchers—

See *Stretchers, Carpet.*

Cartridges—

Blank Cartridges:
32 C. F., $5.50.....10&5%
38 C. F., $7.00.....10&5%
22 cal. Rim, $1.50.....10&5%
32 cal, Rim, $2.75.....10&5%
B. B. Caps, Con. Ball, Swgd. $1.90
B. B. Caps, Round Ball.....$1.40
Central Fire.....25%
Target and Sporting Rifle..15&5%
Primed Shells and Bullets..15&10%
Rim Fire, Sporting.....50%
Rim Fire, Military.....15&5%

Casters—

Bed .....65&10@70%
Plate .....60@60&5%
Philadelphia .....70&10@75%
Acme, Ball Bearing.....35%
Gem (Roller Bearing).....70&10&10&5%
Steel Gem (Roller Bearing).....70%
Standard Ball Bearing.....45%
Yale (Double Wheel) low list....40&10%

Cattle Leaders—

See *Leaders, Cattle.*

Chain, Proof Coil—

American Coil, Straight Link:

3-16	¼	5-16	⅜	½	⅝
$7.45	4.80	3.85	3.25	3.10	3.00

¾-⅞-1 1⅛ to 1¼ inch.
$2.90 3.00
German Coil.....70&5%
German Pattern Coil:
6-0 to 1.....70&10&5%
2 and 3.....60&10&10@70%
4, 5 and 6.....50&10@50&10&5%

Halter—

Halter Chains.....60&5@60&10%
German Pattern Halter Chains, list July 2½, '97.....70&5%
Covert Mfg. Co.:
Halter .....35&5%

Cow Ties—

See *Halters and Ties.*

Trace, Wagon, &c.—

Traces, Western Standard; 100 pr.
6½—6-3, Straight, with ring..$26.00
6½—6-2, Straight, with ring..$27.00
6½—8-2, Straight, with ring..$30.00
6½—10-2, Straight, with ring..$35.00
NOTE.—Add 2c per pair for Hooks Twist Traces: add per pair for Nos. 2 and 3, 2c; No. 1, 3c; No. 0, 4c to price of Straight Link.
Eastern Standard Traces, Wagon Chain, &c.....70&10@—%

Miscellaneous—

Jack Chain:
Iron .....60&10&5@60&10&10%
Brass 65%
Safety and Plumbers' Chain..75%
Gal. Pump Chain....lb., 4½@5%
Bridgeport Chain Co.:
Triumph Halter and Coil.....35&2½@40%
Triumph Dog.....10@60%
Brown Halter and Coil.....50&5%
Covert Mfg. Co.:
Breast, Halter, Heel, Rein, Stallion 40%
Oneida Community:
American Halter, Dog and Kennel Chains .....35&2½@40%
Niagara Dog Leads and Kennel Chains .....45@50&5%
Wire Goods Co.:
Dog Chain.....70%
Universal Dbl. Jointed Chain....70%

Chain and Ribbon, Sash—

Oneida Community:
Steel Chain.....60%
Pullman:
Bronze Chain, 60%; Steel Chain, Coppered .....60&10%
Sash Chain Attachments, per set..8¢
Aluminoy Sash Ribbon, per 100 ft. .....$2.00@$5.00
Sash Ribbon Attachments, per set..8¢

Chalk—

Carpenters' Blue....gro., 50@55¢
Carpenters' Red.....gro., 50@55¢
Carpenters' White...gro., 40@45¢

Checks, Door—

Bardsley's 65%
Pullman, per gro.....$54.00
Russwin 33⅓%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools.....65%
Youths' Chests, with Tools.....40%
Gentlemen's Chests, with Tools..30%
Farmers', Carpenters, etc., Chests, with Tools 20%
Machinists' and Pipe Fitters' Chests, Empty.....45%
Tool Cabinets.....45%
C. E. Jennings & Co.'s Machinists' Tool Chests.....7½%

Chisels—

Socket Framing and Firmer

Standard List..80&10@80&10&10%
Buck Bros.....30%
C. E. Jennings & Co.:
Socket Firmer No. 10.....25&7½%
Socket Framing No. 15.....25&7½%
Swan's .....66⅔@70%
L. & I. J. White & Co.....30@30&5%

Tanged—

Tanged Firmers.....30&5@35%
Buck Bros.....30%
C. E. Jennings & Co. Nos. 191, 181..25%
L. & I. J. White Co.....25&5%

Cold— *lb.*

Cold Chisels, good quality..13@15¢
Cold Chisels, fair quality..11@12¢
Cold Ch. sets, ordinary.... 9@10¢
Elmore Tool Mfg. Co.:
Cold Chisels.....50&5%

Chucks—

Almond Drill Chucks.....35%
Almond Turret Six-Tool Chuck.....40%
Beach Pat. each $8.00.....35&5%
Blacksmiths'.....25%
Cincinnati Chuck Co.:
Independent 4-jaw Reversible.....35%
Empire 25%
Jacobs' Drill Chucks.....35%
Pratt's Positive Drive.....25%
Skinner Lathe Chucks:
Independent 35%
Universal, Reversible Jaws.....35%
Universal, Com. Style Jaws.....40%
Combination, Reversible Jaws....35%
Combination, Com. Style Jaws...40%
Round Body or Box Body, 2 Chuck Jaws 25%
Geared Scroll Chucks.....25%
Drill Chucks:
New Model, 25%; Geared Pattern, 25%; Skinner Patent, ...25%
Positive Drive.....40%
Planer Chucks.....20%
Standard 45%
Drill Press Vises.....50%
Face Plate Jaws.....35%
Standard Tool Co.:
Improved Drill Chuck.....45%
Union Mfg. Co.:
Combination, Nos. 1, 2, 3, 4, 5, 6, 7, 8 and 11, 40%; No. 21.....35%
Scroll Combinations, Nos. 83 and 84 .....50%
Geared Scroll, Nos. 33, 34 and 35..25%
Independent Iron, Nos. 18 and 318..35%
Independent Steel, No. 64.....25%
Union Drill, Nos. 000, 00, 100, 101, 102, 103, 104.....35%
Union Czar Drill.....25%
Universal, 11, 12, 16, 17, 13, 14, 15..40%
Universal No. 42.....35%
Iron Face Plate Jaws, Nos. 28, 30, 48 and 50.....35%
Steel Face Plate Jaws, Nos. 70 and 72 .....30%
Westcott Patent Chucks:
Lathe Chucks.....50%
Little Giant Auxiliary Drill.....50%
Little Giant Double Grip Drill...50%
Little Giant Drill, Improved.....50%
Oneida Drill.....50%
Scroll Combination Lathe.....50%
Whitaker Mfg. Co.:
National Drill.....25%

Clamps—

Carriage Makers', Star, P., S. & W. Co. 50%
Besly, Parallel.....33⅓&10%
Hammer & Co.:
Adjustable .....20&5%
Carriage Makers' H. P. Screw.40&5%
Myers' Hay Rack.....50%
Lineman's Swedish Neverturn.....65%
Saw Clamps, see Vises, Saw Filers'

Cleaners, Drain,

Iwan's Champion, Adjustable.....50%
Iwan's Champion, Stationary.....40%

Sidewalk—

American Fork & Hoe Co.:
Star, ℔ doz., Socket, $4.00; Shank $3.50
Shank, ℔ doz., X 7/16, $3.50; Shank, ½ X 8.....$3.75

Cleavers, Butchers'—

Foster Bros.....30%
Fayette R. Plumb.....30%
L. & I. J. White Co.....30%

Clippers, Horse and Sheep—

Chicago Flexible Shaft Co.:
1902 Chicago Horse, each..$10.75
20th Century Horse, each...$5.00
Lightning Belt Horse, each, $15.00
Chicago Belt Horse, each..$20.00
Stewart's Enclosed Gear Ball Bearing Horse, each.....$7.50
Stewart's New Model Sheep Shearing Machine, each..$12.75
Stewart Enclosed Gear Shearing Machine, No. 8, each..$9.75
} 25%

Clips, Axle—

Regular Styles.....80&80&10%

Cloth and Netting, wire —See *Wire, &c.*

Cocks, Brass—

Hardware list:
Plain Bibbs, Globe, Kerosene, Racking, Liquor, Bottling, &c 75%
Compression Bibbs.....70%

Coffee Mills—

See *Mills, Coffee.*

Collars, Dog—

Nickel Chain, Walter B. Stevens & Son's list.....40%
Leather, Walter B. Stevens & Son's list 40%

Compasses, Dividers, &c.

Ordinary Goods.....75@75&5%

Conductor Pipe,—

L. C. L. to Dealers:

	Gal. Steel.	*Charcoal.*	*Copper.*
Northeastern:			
70&10@—%	*50&10&7½%*		*50&10%*
Eastern:			
75@—%	*50&10&7½%*		*50&10%*
Central:			
75@—%	*60%*		*50&10%*
Northwestern:			
75@—%	*60%*		*50&10%*
Western:			
70&10@—%	*50&12½%*		*50&5%*
Tennessee:			
70&10@—%	*50&12½%*		*50&10%*
Southern:			
70&10@—%	*50&12½%*		*50&5%*
Southwestern:			
70@—%	*50&5%*		*50&5%*

Terms, 60 days: 2% cash 10 days. Factory shipments generally delivered.

See also Eave Troughs.

Coolers, Water—

L. & G. Mfg. Co.:

Gal.	2	3	4	6	8
Galvanized, ea.	$1.85	$2.00	$2.25	$2.90	$3.90

Galvanized, Lined, side handles,

Gal.	2	3	4	6	8
Each	$1.95	$2.15	$2.40	$3.30	$4.15

White Enameled.....10%
Agate Lined.....10%

Coppers' Tools—

See *Tools, Coopers'.*

Coppers, Soldering—

Soldering Coppers, 3 lb. to pair and heavier, 21½¢; lighter than 3 lb. to pair.....23½¢

Cord— Sash—

Braided, Drab.....lb. 35¢
Braided, White, Com., Nos. 8 to 12, 23½¢; No. 7, 23¢; No. 6, 25¢. In lots of 12 doz. or over, 1 cent less per pound.
Cable Laid Italian, lb., No. 18..37¢
Italian, lb., A, No. 18, 25¢; B, 22¢
Common India.....lb., 11@11½¢
Cotton Sash Cord, Tw'ted..18@20¢
Patent Russia.....lb....20¢
Cable Laid Russia.....lb...21¢
India Hemp, Br'd'd.....lb...21¢
India Hemp, Twisted...lb.13@14¢
Patent India, Twisted..lb...17¢
Pearl Braided, cotton, No. 6, ℔ lb. 20½¢; No. 7, 19½¢; Nos. 8 to 12, 19½¢, in 12 doz. to 100 doz. lots. Eddystone Braided, Nos. 8 to 12, 26¢; 7, 26½; 6, 27½¢.
Harmony Cable Laid Italian, Nos. 7 to10.....℔ lb 23¢
Pullman:
Wire Sash Cord.....10%
Sash Cord Attachments, per 100..$2.00
Samson, Nos. 8 to 12:
Braided, ℔ lb., Drab Cotton, 55¢; Italian Hemp, 40¢@50¢; Linen, 65¢; White Cotton, 50¢; Spot Cord.....50¢
Massachusetts, White...℔ lb 40¢
Massachusetts, Drab....℔ lb 45¢
Phoenix, White, Nos 8 to 12....27¢
} 15%
Silver Lake, per lb.:
A, Drab, 45¢; A, White, 40¢; B, Drab, 40¢; B, White, 35¢; Italian Hemp, 40¢; Linen....57½¢
See also Chain and Ribbon.

Wire, Picture—

Full Length.....90@—%
Short Length.....90&20@—%
Hendryx Standard Wire Picture Cord .....90&10%
Turner & Stanton Co. Wire Picture Cord 90%

Cradles—

Grain 50%

Crayons—

White Round Crayons, Cases, 100 gro., $8.00, $8.50, $9.00 and $10.00 according to grade.
Zelnicker's Lumber: ℔ gro.
White and Purple, Indelible....$7.50
Blue, Red, Green, Yellow and Terra Cotta, $6.50; Black.....$4.50
Giant Lumber, 5¼ in. x 15-16 in. round, all colors, $12.00; Indelibles, $14.00; Blacks.....$10.00
Genuine Soapstone, Metal Workers', 5 in. x ¼ in. Round, $2.50; 5 in. x ¼ in. Square, $1.75; 5 x ½ x 3-16, $2.50; 5 x 1¼ x 3-16.....$3.00
Suremark, Black, $2.25; Blue, Red and Yellow.....$2.50

Crooks, Shepperds'—

American Fork & Hoe Co.:
Montana .....℔ doz. $4.50

Crow Bars—See *Bars, Crow.*

Cultivators—

American Fork & Hoe Co.:
Victor Garden.....50&10%

Cutlery, Table—

International Silver Company:
No. 12 M'd'm Knives, 1847, ℔ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor.....℔ doz. $3.00
Wm. Rogers & Son.....℔ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co.....40%
Red Devil.....60%
B. Mfg. Co.....40%
Woodward 50%

Meat and Food—

American 30%

Nos.	401	402	403	404	405	406	407
Each	$5	$7	$10	$12	$25	$30	$60

Enterprise:

Nos.	5	10	12	22	32
Each	$2	$3	$2.75	$1.50	$6

25@25&7½%
No. 202, $1.50.....40&7½%
P., S. & W. Co.:
Ideal .....40@40&5%
Hales .....60&5%
Little Giant.....℔ doz. 40@50%

Nos.	305	310	312	320	322
	$35.00	$18.00	$44.00	$72.00	$68.00

New Triumph No. 605, ℔ doz. $24.00.....40%
Russwin Food. No. 1, $24.00; No. 2, $27.00; 3, $42.00.....45&10&10%
$15.00 $18.00
Enterprise Beef Shavers.....25@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw and Kraut Cutters.....35%
Corn Graters.....30%
J. M. Mast Mfg. Co.:
Slaw Cutters, 1 Knife....℔ doz. $3.00
Combined Slaw Cutter and Corn Grater .....℔ doz. $4.00

Tobacco—

All Iron, Cheap...doz, $4.25@4.50
Enterprise .....25@30%
National, ℔ doz., No. 1, $21; No. 2, $18 .....40%

Diggers, Post Hole, &c—

Disston's:
Rapid, ℔ doz., $24.00.....25%
Samson, ℔ doz., $34.00.....25%
Iwan's Pat. Post Hole and Well Auger 40%
Vaughan Pattern Post Hole Augers, ℔ doz., $7.00
Perfection Post Hole Diggers, ℔ doz. $8.50
Split Handle Post Hole Diggers, ℔ doz., $7.50
Hercules Pattern, ℔ doz.....$9.50
Kobler's, ℔ doz., Universal, $14.00; Little Giant, $12.00; Hercules, $10.00; Invincible, $9.00; Rival, $8.50; Pioneer.....$7.50
Never-Break Crucible Steel Post Hole Diggers 60%

Dividers—See *Compasses.*

Drawing Knives—

See *Knives, Drawing.*

Dressers Emery Wheel—

Sterling Emery Wheel Dressers.....35%
Sterling Wheel Dresser Cutters.....35%

Drills and Drill Stocks—

Blacksmith's Common Drilling Machines .....$1.50@1.75
Breast, Millers Falls.....15&10%
Breast, P., S. & W.....33⅓%
C. & C. Ratchet.....25%
Reversible Ratchet Die Stocks....25%
Goodell Automatic Drills.50&10&60&10%
Millers Falls Automatic Drills, Graves', per doz., Nos. 1, $4.86; 2, $8.16.
Millers Falls Automatic Drills.33⅓&10%
Ratchet, Curtis & Curtis.....25%
Ratchet, Parker's.....40%
Ratchet, Weston's.....40%
Ratchet, Weston's, Style H Improved .....40@40&5%
Ratchet, No. 012.....40@40&5%
Ratchet, Celebrated.....10@40&5%
Ratchet, Whitney's, P., S. & W. .....40&10@50%
Star Drills .....50&10%
Star Pipe Drills.....50%
Star Drill Holders.....50&10&10%
Star Drill Points.....50&10&10%
Whitney's Adjustable, No. 19, $12.00.....33⅓%

Twist Drills—

Bit Stock.....70@70&10%
Taper and Straight Shank, 65@65&10%

Drivers, Screw—

Screw Driver Bits, per doz..45@50¢
Balsey's Screw Holder and Driver, ℔ doz., 2¼-in., $6; 4-in., $7.50; 6-in., $9 .....50%
Buck Bros.' Screw Driver Bits.....30%
Champion 50%
Disston's Screw Drivers, Handles and Ferrules 70%
Elmore Tool Mfg. Co.:
Elmore 60%
Hartford 66⅔%
Indestructible .....55&7%
Standard Neverturn.....66⅔%
Star .....75&5%
Screw Driver Bits.....25%
Fray's Hol. H'dle Sets, No. 3, $12..50%
Ford's Brace Screw Drivers....40&10%
Gay's Double Action Ratchet.....35%
Goodell's Auto.....65@65&10%
Mayhew's Black Handle.....40%
Mayhew's Monarch.....40%
Millers Falls, ℔ doz., Nos. 11, $9.96; 12, $13.75; 20, $8.17; 21, $8.46; 41, $13.43; 42, $17.21.
Swan's:
Nos. 7565 to 7568, 60%; No. 7540 .....40&10%

Eave Trough, Galvanized—

Territory.	*Gal. Steel.*	*Copper.*
Northeastern	*75&10&5%*	*50&10%*
Eastern	*80%*	*50&10%*
Central	*80&10&5%*	*50&10%*
Northwestern	*80&10&5%*	*50&10%*
Western	*80&5%*	*50&5%*
Tennessee	*80&5%*	*50&10%*
Southern	*75&10%*	*50&5%*
Southwestern	*75&10&2½%*	*50&5%*

Terms.—2% for cash. Factory shipments generally delivered.
Note.—Lower prices are quite general owing to market irregularities.
See also Conductor Pipe and Elbows.

Elbows and Shoes—

Factory shipments, all territories:

	Galv. Steel.	*Galv. C. I. and Copper.*
Sizes 2, 3, 4		*80%*
Sizes 1½, 2½, 3½, 5, 6		*60&10%*
No. 26		*50%*
No. 24		*25%*
Copper Elbows		*50%*

Elbows, Stove Pipe—

Edwards, Standard Blue....40&10&10%
Edwards, Royal Blue.....40&10&10%
Reeves, Dover, Flat Crimp..40&10&5%

Emery, Turkish—

	¼ to 46:	5½ to 280:	Flour.
Kegs ..... *lb.*	*5 ¢*	*5½¢*	*3½¢*
½ Kegs ..... *lb.*	*5½¢*	*5¾¢*	*3¾¢*
¼ Kegs ..... *lb.*	*5½¢*	*6 ¢*	*4 ¢*

10-lb. cans, 10 in case....6½¢ 7 ¢ 6 ¢
10-lb. cans, less than 10.....10 ¢ 10 ¢ 8 ¢
Less quantity..10 ¢ 10 ¢ 8 ¢
NOTE.—In lots 1 to 3 tons a discount of 10% is given.

Extensions, Bit—
Ford's Auger Bit Extensions....40&5%

Extractors, Lemon Juice—
—See *Squeezers, Lemon.*

Fasteners, Blind—
Zimmerman's Jap'd and Galv., 50 & 5%; Bronze and Plated.....50%
Walling's 50%
Upson's Patent.....40%

Cord and Weight—
Ives, ₩ gro., $1.08.....10%
Titan, ₩ gro., $0.96.....10%

Corrugated—
Acme Corrugated Fasteners.....70%

Faucets—
Cork Lined.....50&10@60%
Metallic Key, Leather Lined, .. 60&10@70%
Red Cedar.....40&5@40&10&5%
Petroleum .....70&10@75%
B. & L. B. Co.:
Metal Key.....60&10%
Star 60%
West Lock.....50&10%
John Sommer's Peerless Tin Key....40%
John Sommer's Boss Tin Key.....50%
John Sommer's Victor Mtl. Key.50&10%
John Sommer's Duplex Metal Key..60%
John Sommer's Diamond Lock.....40%
John Sommer's I.X.L. Cork Lined..50%
John Sommer's Reliable Cork Lined.. 50&10%
John Sommer's Chicago Cork Lined.60%
John Sommer's O. K. Cork Lined...50%
John Sommer's No Brand, Cedar....50%
John Sommer's Perfection, Cedar....40%
Self Measuring:
Enterprise, Self Measuring and Pump, ₩ doz., $36.00.....40&10%
Lane's, ₩ doz., $36.00.....40&10%
National Measuring ₩ doz. $36.40&10%

Felloe Plates—
See *Plates, Felloe.*

Files— Domestic—
List Nov. 1, 1899.
Best Brands.....70&10@75&10%
Standard Brands.....75&10@80%
Lower Grade....75&10&10@80&10%
Disston's Superfine.....60%
Gold Medal.....70%
McCaffrey's American Standard, 60&10&10%

Imported—
Stubs' Tapers, Stubs' list, July 24, '97.....33⅓@40%

Fixtures, Fire Door—
Richards Mfg. Co.:
Universal, No. 103; Special, No. 104 .....$3.75
Fusible Links, No. 96.....50%
Expansion Bolts, No. 107.....60&10%

Grindstone—
Net Prices:

Inch	*15*	*17*	*19*	*21*
Per doz.	*$3.60*	*3.85*	*4.15*	*4.65*

Peck, Stow & Wilcox Co.:

In	15	17	19	21	24
	$4.00	4.40	4.75	5.50	6.50....30%

Reading Hardware Co.....60%

Fodder Squeezers—
See *Compressors.*

Forks—
American Fork & Hoe Co.:
Iowa Dig-Ezy Potato.....70&5%
Hay, Regular, 3-tine.....45&20&12½%
Hay, Regular, 4-tine.....60&7½&5%
Champion, Hay.....60&12½%
Acme, Hay.....60&20%
Manure, Regular, 4-tine.....65&5%
Manure, Regular, 5 and 6 tine...70%
Champion, Manure.....65&5%
Columbia, Manure.....70%
Acme, 4-tine.....60&10&5%
Round Shoulder Header, 4-tine..65%
Champion, Header.....65%
Dakota, Header.....65%
Kansas Header.....65%
Wood, Barley.....35&5%
Steel, Barley.....66⅔%
Columbia, Spading.....70&7½&5%

Frames— Wood Saw—
White, S'g't Bar, per doz..75@80¢
Red, S'g't Bar, per doz..$1.00@1.25
Red, Dbl. Brace, per doz.$1.40@1.50

Freezers, Ice Cream—

Qt.	*1*	*2*	*3*	*4*	*6*
Each	*$1.25*	*$1.60*	*$1.90*	*$2.20*	*$3.80*

Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse—	Per 1000 Feet.
Hemp	$2.75
Cotton	3.20
Waterproof Sgl. Taped	3.65
Waterproof Dbl. Taped	4.40
Waterproof Tpl. Taped	5.15

50&10&10%

Gates, Molasses and Oil—
Stebbins' Pattern.....80@80&5%

Gauges—
Marking, Mortise, &c..50@50&10%
Chapin-Stephens Co.:
Marking, Mortise, &c.....50&50&10%
Disston's Marking, Mortise, &c.60&10%
Wire, Brown & Sharpe's.....33⅓%
Wire, Morse's.....25%
Wire, P. S. & W. Co.....33⅓%

Gimlets— Single Cut—
Numbered assortments, per gro.
Nail, Metal, No. 1, $2.00; 2, $2.30
Spike, Metal, No. 1, $1.00; 2, $1.50
Nail, Wood Handled, No. 1, $2.30; 2, $2.60
Spike, Wood Handled, No. 1, $1.30; 2, $1.60

Glass, American Window
See *Trade Report.*

Glasses, Level—
Chapin-Stephens Co.....65@65&10%
Disston & Sons.....60&10%

Glue, Liquid Fish—
Bottles or Cans, with Brush, 25&10@50%
Elwell's 50%

Grease, Axle—
Common Grade...gro.$6.00@$6.50
Dixon's Everlasting, 10-lb. pails, ea. 85¢; in boxes, ₩ doz., 1 lb, $1.20; 2 lb.....$2.00
Helmet Hard Oil.....25%

Griddles, Soapstone—
Pike Mfg. Co.....33⅓@33⅓&10%

Grinders—
Pike Mfg. Co.:
Hand and Foot Power, Pyko Nos. 1, 2, 3; Pyko Primo; Pyko Peerless; Pyko Spiral (foot power).33⅓%
Mower Knife and Tool, $5.00..40&10%
Royal Mfg. Co.:
Hand and Foot Power, each, Nos. 01, $1.75; 1A, $2.50; 10, $5.00 .....33⅓%
Sickle Grinders, each, Nos. 20, $5.00; 20A, $6.00; 20A Combined, $6.50 .....40%
Disc Grinders, each, $2.50.....40%

Grindstones—
Pike Mfg. Co.:
Improved Family Grindstones, ₩ inch, ₩ doz., $2.00.....33⅓%
Richards Mfg. Co., Eli and Cycle Ball Bearing, mounted.....40%

Grips, Nipple—
Perfect Nipple Grips.....40&10&2%

Halters and Ties—
Cow Ties.....70&10@—%
Bridgeport Chain Co.:
Triumph Coil and Halters.35&2½@40%
Brown Coil and Halters...45@50&5%
Brown Cow Ties.....50&5@50&10&5%
Brown Tie Outs.....70&10@75&5%
Covert Mfg. Co.:
Web .....30&2%
Jute Rope.....35%
Sisal Rope.....20%
Cotton Rope.....45%
Hemp Rope.....45%
Oneida Community:
Am. Coil and Halters.....40@40&5%
Am. Cow Ties.....45@50%
Niagara Coil and Halters...45@50&5%
Niagara Cow Ties.....45&5@50&10&5%

Hammers—
Handled Hammers—
Heller's Machinists'....35&10@35&10&5%
Heller's Farriers.....40&5@40&10&5%
Peck, Stow & Wilcox Co.:
Crucible Steel.....40&10@50%
Farriers' .....40&10@50%
Riveting .....40&10@50%
Machinists' .....66⅔@75%
Blacksmiths' 50%
Elmore Shoemakers' Hammers.....75%
Fayette R. Plumb:
A. E. Nail.....40&2½@40&12½%
Eng. and B. S. Hand.50&10&5@60&5%
Machinists' Hammers.....60&10&5%
Rivet and Tinners'.40&7½@40&12½&5%
Victor Magnetic Tack, ₩ gro....$7.75

Heavy Hammers and Sledges—
Under 3 lb., per lb., 50¢...80&10%
3 to 5 lb., per lb., 40¢...80&10&10%
Over 5 lb., per lb., 30¢.....
Over 5 lb., per lb., 30¢.80&10&10%

Handles—
Agricultural Tool Handles
Axe, Pick, &c....60&10@60&10&5%
Hoe, Rake, &c.....40%
Fork, Shovel, Spade, &c.:
Long Handles.....40%
D Handles.....40%

Cross-Cut Saw Handles—
Atkins' 40%
Disston's Handles and Saw Tabs..45%

Mechanics' Tool Handles—
Auger, assorted...gro.$3.00@$3.50
Brad Awl.....gro.$1.65@$1.75
Chisel Handles, Ass'd, per gro.:
Tanged Firmer, Apple, $2.40@ $2.65; Hickory.....$2.15@2.40
Socket Firming, Apple, $1.75@ $1.95; Hickory.....1.60@1.75
Socket Framing, Hickory, $1.60@$1.75
File, assorted.....gro.$1.30@$1.40
Hammer, Hatchet, &c., 60&10@60&10&5%
Hand Saw, Varnished, doz., 80¢ 85¢; Not Varnished.....65@75¢
Plane Handles:
Jack, doz., 30¢; Fore, doz...45¢
Chapin-Stephens Co.:
Carving Tool.....30&30&10%
Chisel .....60&60&10%
File and Awl.....60&60&10%
Saw and Plane.....30&30&10%
Screw Driver.....30&30&10%
Millers Falls Adj. and Ratchet Auger Handles .....15&10%
Nicholson Simplicity File Handle ... ₩ gro. $0.85@$1.50
J. L. Osgood:
Indestructible File and Tool, ₩ gro., No. 1, $8.00; No. 2, $8.50; No. 3, $9.00; No. 4, $9.50; No. 5, $10.00.....gro. lots 10%
W. A. Zelnicker Supply Co.:
Hammer, ₩ doz., 12 in., $2.00; 14 in., $2.00; 16 in., $2.30; 18 12., $2.50; 20 in., $2.70; 22 in., $3.00; 24 in., $3.30; 26 in., $3.50; 30 in., $3.80.
Sledge, ₩ doz., oval, 30 in., $3.80; octagon, 30 in., $3.80; oval, 36 in., $4.00; octagon, 36 in., $4.00.
Axe, ₩ doz., 28 to 34 in., $5.60; 36 in., $5.80.
Adze, ₩ doz., 36 in., $5.80; 36 in., $7.80.
Pick, ₩ doz., R. R., 36 in., $8.00; coal; 34 in., $5.80.
Hatchet, ₩ doz., 12 to 14 in., $2.00.
50%

Hangers—
NOTE.—Barn Door Hangers are generally quoted per pair, without track and Parlor Door Hangers per double set with track, &c.
Chicago Spring Butt Co.:
Friction 25%
Oscillating 25%
Big Twin.....25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door.....50%
Elevator 30%
Railroad 50%
Cronk & Carrier Mfg. Co.:
Loose Axle.....60&10%
Roller Bearing.....70%
Griffin Mfg. Co.:
Solid Axle, No. 10, $12.00..60&10%
Roller Bearing, No. 11, $15.00, 60&10%
Roller Bearing, Ex. Hy., No. 22, $18.00.....60&10%
Bull Dog, $24.00.....70%
Lane Bros. Co.:
Parlor, Ball Bearing, $1.00: Standard, $3.15; No. 105, $2.85; New Model, $2.80; New Champion per set of 4 Hangers, complete with track.....$2.25
Barn Door, Standard.....60&10%
Hinged .....net $6.08
Covered .....60&5%
Special .....70&5%
Trolley Hangers and track...50%
Lawrence Bros.:
Cleveland .....70&7½%
Clipper, No. 75.....60%
Crown .....55&10%
Cyclone, No. 40.....net $6.50
Tandem, No. 50.....net $7.50
New York.....55&10%
Trolley, No. 30, ₩ pair.....$1.25
McKinney Mfg. Co.:
Roller Bearing, Nos. 1 and 2..70%
Anti-Friction 60%
Hinged Hangers, King Charm.60%
Richards Mfg. Co.:
Hangers, Nos. 47, 48, 147, 247, 60&5%
Pioneer Wood Track, No. 3..$2.25
Roller B'r'g St'l Track No. 12.$2.20
Roller B'r'g St'l Track No. 13.$2.50
Roller B'r'g, Nos. 39, 41, 43 ... 70&7½%
Hero, Adj. Track No. 19..50&10%
Adjustable Track Tandem Trolley Track No. 16.....50&10%
Seal, Steel Track No. 8....$2.25
Auto Adj. Track No. 22..50&5%
Trolley B, D, No. 17, $1.25; F, D, No. 120 $2.25; No. 121, $2.45; No. 150.....$2.50
Safety Underwriters F. D. No. 101 .....50%
Tandem No. 41, 2½ and 3 60&10%
Palace, Adjustable Track No. 132 .....50&5%
Royal, Adjustable Track No. 122 .....50&10%
Ives' Wood Track No. 1.....$2.25
Trolley B, D, No. 20.....50&10%
Trolley B, D, No. 24, $1.30; No. 27, $1.40; No. 28.....$1.60
Roller Bearings, Nos. 37, 38, 39, 41, 43, 44, Sizes 1 and 2.70&7½%
Anti-friction, No. 42; No. 44, sizes 2½ and 3.....60%
Hinged Tandem No. 48....60&5%
Folding Door R. B. Swivel No. 135 .....40%
Taylor & Boggis F'y Co.'s Kidder's Roller Bearing, ₩ doz., 4 in., $12.00; 5 in., $14.00..40&10%
Myers' Stayon Hangers.....60%

Hangers— Garment—
Pullman Trouser, ₩ gro., No. 1 $9.00; No. 4, $24.00; No. 5, $16.50; No. 8, Black Enamel, $7.50; No. 10, $21.00; No. 12, $8.00; No. 15, Rods, $9.00; No. 18, Loops.....$10.80
Victor Folding.....₩ gro. $9.60

Gate—
Myers' Patent Gate Hangers, ₩ doz. net 50%

Joist and Timber—
Lane Bros. Co.....35%

Hasps—
Griffin's Security Hasp.....50&10%
McKinney's Perfect Hasp, ₩ doz..60%

Hatchets—
Regular list, first qual.50&10@60%
Second quality.....60@60&10%

Heaters, Carriage—
Clark, No. 5, $1.25; No. 5R, $1.50; No. 3, $1.75; No. 3D, $2.00; No. 7D, $2.25; No. 3E, $2.50; No. 1, $3.00.....25%
Clark Coal, ₩ doz., $0.75.....20%

Hinges—
Blind and Shutter Hinges
Surface Gravity Locking Blind:
Doz. Sets with Fastenings, No. 1, $0.70; No. 3, $1.25; No. 5, $2.65.
Mortise Shutter.....80%
Mortise Reversible Shutter..80%
North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50.....10%
Charles Parker Co.....70&75%
Parker Wire Goods Co.
Hale & Benjamin Automatic Blind Hinges 20%
Hale's Blind Awning Hinges, No. 110, for wood, $9.00; No. 111, for brick, $9.00.....20%
Reading's Gravity.....60%
Stanley's Steel Gravity Blind Hinges, No. 1647½, ₩ doz.—sets, without screws, $0.95; with screws, $1.25.
Wrightsville Hardware Co.:
O. S., Lull & Porter.....75&5%
Acme, Lull & Porter.....75%
Queen City Reversible.....75%
Shepard's Noiseless, Nos. 60, 65, 55 .....75&5%
Niagara, Gravity Locking, Nos. 1, 3 & 5.....75&5%
Clark's O. P., No. 1.....75&10%
Clark's O. P., Nos. 3 and 5....75&5%
Tip Pat'n, No. 1.....75&10%
Clark's No. 3.....75&5%
Buffalo Gravity Locking, Nos. 1, 3 & 5.....70&10&5%
Shepard's Double Locking.....75%
Champion Gravity Locking.....75&5%
Pioneer .....75&10%
Empire 65%
W. H. Co.'s Mortise Gravity Locking, No. 2.....60&10%

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No.	*1*	*2*	*3*
Hinges with L'f'chs.	*$2.00*	*2.70*	*5.00*
Hinges only.....	*1.25*	*1.90*	*3.50*
Latches only.....	*.70*	*.75*	*.35*

New England:
With Latch.....doz..@$2.00
Without Latch.....doz..@$1.60
Reversible Self-Closing:
With Latch.....doz..@$1.75
Without Latch...doz. ...@$1.35
Western:
With Latch.....doz. $1.75
Without Latch.....doz..$1.15
Wrightsville Hardware Co.:
Shepard's or Clark's Hinges and Latches, Hinges only or Latches only, Nos. 1, 2 or 3.....70%

Miscellaneous—
Griffin Mfg. Co., Fleur de Lis Surface Hinges, ₩ doz. prs.....$1.00

Pivot Hinges—
Bommer Bros. Pivot, Ball Bearing 40%
Lawson Mfg. Co. Matchless.....30%

Spring Hinges—
Holdback, Cast Iron...$6.75@$7.00
Non-Holdback, C'st Iron$6.50@$6.75
J. Bardsley:
Bardsley's Non-Checking Mortise Floor Hinges.....40%
Bardsley's Patent Checking.33⅓%
Bommer Bros.:
Spring Butt Hinges.....40%
Surface Floor, Ball Bearing 40%
Mortise Floor, Ball Bearing.40%
Lavatory Hinges.....40%
Non-Holdback Screen Door, Nos. 2000 and 900.....40%
Holdback Screen Door, No. 999.....₩ gro. $9.00
Chicago Spring Butt Co.:
Chicago Spring Hinges.....25%
Triple End Spring Hinges....50%
Chicago (Ball Bearing) Floor.50%
Garden City Engine House...25%
Keene's Saloon Door.....25%
Columbian Hardware Co.:
Acme, Wrought Steel.....30%
Acme, Brass.....25%
American 30%
Columbia, ₩ gr., No. 14, $9.00; No. 18.....$25.00
Columbia, Adj., No. 7, ₩ gr.$12.00
Gem, new list.....30%
Clover Leaf and Acorn, per gro. $12.00
Oxford, new list.....30%
Floor Spring Hinges.....65&10%
Columbian Steel.....65&10%
Lawson Mfg. Co.:
Matchless Spring Hinges.....30%
Matchless Jamb Hinges.....30%
Richards Mfg. Co.:
Superior Double Acting Floor Hinges 40%
Shelby Spring Hinge Co.:
Buckeye All Steel Holdback Screen Door.....₩ gr. $9.00
Chief Ball Bearings Floor Hinge 50%
Ball Bearing Door.....25%
No. 777, Sheet Steel Holdb'k, ₩ gr. pr.....$9.00
Standard Mfg. Co.:
Champion Double Acting Door Hinge .....25&10&10%
Standard Double Acting Floor Hinge .....25&10&10%
Superior Spring Hinge Co.:
Superior Floor Hinges.....40%
Spring Hinges.....40%

Extra 5&10% often given.

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list February 10, 1908:
Light Strap Hinges....65%
Heavy Strap Hinges....75%
Light T Hinges.....60%
Heavy T Hinges.....40&10%
Extra Hvy. T Hinges.65&10%
Hinge Hasps.....40%
Cor. Heavy Strap.....75%
Cor. Ex. Heavy T...65&10%

Extra, 5¢ —

Screw Hook and Strap. 6 to 12 in. .lb. 3½¢; 1½ to 20 in. .lb. 3¼¢; 22 to 33 in. .lb. 3 ¢

Screw Hook and Eye:
⅜ to 1 inch.....lb. 6¼¢
⅝-inch .....lb. 7½¢
½-inch .....lb. 8½¢

Hitchers, Stall—
Covert Mfg. Co., Stall Hitchers..30&2%

Hods— Coal—
M'f'gr's list, price per gross:

Inch	*15*	*16*	*17*	*18*
Galv. Open	*$35*	*$39*	*$4*	*$46*
Jap. Open	*26*	*28*	*3.*	*35*
Galv. Funnel	*43*	*48*	*52*	*56*
Jap. Funnel	*33*	*36*	*39*	*43*

10&7½&5%

Masons' Etc.
Cleveland Wire Spring Co.:
Steel Brick, No. 162.....each $1.05
Steel Mortar, No. 158.....each $1.35

Hoes—Eye—
Scovil and Oval Pattern, 60&10@60&10&10%
Grub, list Feb. 23, 1899, 70&10@70&10&10%
D. & H. Scovil 27½%
Am. Fork & Hoe Co. (Scovil Pattern) ..... 60&5%

Handled—
Cronk's Weeding, No. 1, $2.00; No. 2, $2.50
Star Double Bit $2.50
American Fork & Hoe Co.:
Regular, Cotton ..... 75&10&5&2½%
Crescent, Cultivator ..... 75&2½%
Mattock, Senior 70%
Mattock, Junior 70%
Sprouting 50%
Tobacco, Harper's ..... 66⅔&15&10%
Warren ..... 55&10&10&5%
Ivanhoe ..... 65&15&10%
Cultivator, B B 6 ..... 70&10&10&5%
Cultivator, B B 6½ ..... 70&10&10&5%
Weeding, Acme ..... 72½&10&2½%
Scuffle, Lightning ..... 60&5%

Hoisting Apparatus—
See *Machines, Hoisting.*

Holders—Bit—
Angular, ₱ doz. $24.00 ..... 45&10%

Door—
Bardsley's, Iron, 40%; Brass and Bronze 25%
Empire 50%
Pullman 25%
Richards Mfg. Co.: No. 117, Ever-ready, 40%; Nos. 118, 119, Sure Grip 50%
Superior 40%

File and Tool—
Nicholson File Holders and File Handles ..... 33⅓&10%

Fruit Jar—
Triumph Fruit Jar Holder, ₱ gross, $18.00; ₱ doz. $2.00

Trace and Rein—
Fernald Double Trace Holder, ₱ doz. pairs $1.25
Dash Rein Holder, ₱ doz. $1.25

Hones—Razor—
Pike Mfg. Co., Belgian and Swaty, 50%; German 33⅓%

Hooks—Cast Iron—
Bird Cage, Reading 40%
Clothes Line, Reading List 40%
Coat and Hat, Reading ..... 45&20%
Coat and Hat, Wrightsville ..... 60&5%
Harness, Reading List 40%

Wire—
Belt, Nos. 1 to 15 ..... 75&10@80%
Wire C. & H. Hooks .. 80@80&10%
Bradley Metal Clasp Wire, Coat and Hat, 75&10@80%; Ceiling..75&10@80%
Columbian Hdw. Co., Gem ..... 75&10%
Parker Wire Goods Co., King..75&10%
Wire Goods Co.: Acme, 60&10%; Chief, 70&10%; Crown, 75%; Czar, 65&10%; Brace, 75%; Czar Harness, 50%; Ceiling, 75%.

Wrought Iron—
Box, 6 in., per doz., $0.90; 8 in., $1.15.
Cotton ..... doz. $1.25@$1.50
Wrought Staples, Hooks, &c.—See Wrought Goods.

Miscellaneous—
Hooks, Bench, see *Stops, Bench.*
Bush, Light, doz., $6.20; Medium, $6.75; Heavy, $7.65
Grass, best, all sizes, per doz., $2.75@$3.00
Grass, common grades, all sizes, per doz ..... $1.25@$1.50
Whiffletree ..... lb. 5¾@6¢
Hooks and Eyes:
Brass ..... 60@60&10%
Malleable Iron ..... 70@70&10%
Covert Mfg. Co. Gate and Scuttle Hooks 40%
Turner & Stanton Co. Cup and Shoulder ..... 85&10%
Bench Hooks—See Bench Stops.
Corn Hooks—See Knives, Corn.

Horse Nails—
See *Nails, Horse.*

Horseshoes—
See *Shoes, Horses.*

Hose, Rubber—
Garden Hose, ¾-inch:
Competition ..... ft. 6@6½¢
3-ply Guaranteed .... ft. 8½@9¢
4-ply Guaranteed .... ft. 9½@12¢
Cotton Garden, ¾-in., coupled:
Low Grade ..... ft. 8@ 9¢
Fair Quality ..... ft. 10@11¢

Irons—Sad—
From 4 to 10 ..... lb. 2½@2¾¢
B. B. Sad Irons ..... lb. 3¼@3½¢
Mrs. Potts', cents per set:

	Nos. 50	55	60	65
Jap'd Caps	.86	93	96	93
Tin'd Caps	.91	88	1.01	98

New England Pressing .. lb. 3¾@4¢

Bar and Corner—
Richards Mfg. Co., Bar, 60&10%; Corner 60%

Pinking—
Pinking Irons ..... doz. 60@65¢

Irons, Soldering
See *Coppers.*

Jacks, Wagons—
Covert Mfg. Co.:
Auto Screw ..... 30&2%; Steel, 45%
Lockport 50%
Lane's Steel ..... 30&5%
Richards' Tiger Steel, No. 130...50&10%
Smith & Hemenway Co.'s 25%

Ladder—
Richards Mfg. Co., Ladder Jacks..50%

Jointers—
Pike Mfg. Co., Saw Jointers, $7.00..40%

Kettles—
Brass, Spun, Plain ..... 20@25%
Enameled and Cast Iron—See Ware, Hollow.

Knives—
Butcher, Kitchen, &c.—
Foster Bros.' Butcher, &c. 30%
Wilkinson Shear & Cutlery Co.... 60%

Corn—
Columbian Cutlery Co., Wilcut Brand Knives and Hooks 60%
American Fork & Hoe Co.:
Easy Cut, ₱ doz. No. 10 C H...$2.10
Easy Cut, ₱ doz., No. 10 B C H. $2.20
Acme, ₱ doz. $2.35
Dent, ₱ doz. $2.35
Adjustable, Serrated, ₱ doz. $1.90
Serrated, ₱ doz. $1.85
Yankee, No. 1 C H $1.35
Yankee, No. 2 C H $1.15

Drawing—
Standard List ..... 80&10@—%
C. E. Jennings & Co., Nos. 45, 46, 25&7½%
Jennings & Griffin, Nos. 41, 42, 60%&7½%
Swan's ..... 66⅔@70%
Watrous 16⅔%
L. & I. J. White ..... 20&5@25%

Hay and Straw—
Serrated Edge, per doz. $5.00@5.50
Iwan's Sickle Edge ..... ₱ doz. $9.50
Iwan's Serrated ..... ₱ doz. $10.00

Miscellaneous—
Farriers' ..... doz. $2.60@3.55
Wostenholm's ..... ₱ doz. $3.00@3.25

Knobs—
Base, 2½-inch, Birch or Maple, Rubber Tip ..... gro. $1.25@1.40
Carriage, Jap., Drive, all sizes, gro. 35@40¢
Door, Mineral ..... doz. 65@70¢
Door, Por. Jap'd ..... doz. 70@75c
Door, Por. Nickel .. doz. $2.05@2.15
Bardsley's Wood Door, Shutters, &c. 15%

Lacing, Leather—
See *Belting, Leather*

Ladders, Store, &c.—
Lane's Store 25%
Myers' Noiseless Store Ladders.... 50%
Richards Mfg. Co.:
Improved Noiseless, No. 112 ..... 50%
Climax Shelf, No. 113 ..... 50%
Trolley, No. 109 ..... 50%

Ladles, Melting—
L. & G. Mfg. Co., Melting and Plumbers' 25%
P., S. & W. ..... 40&10%
Reading 60%

Lamps,—
Hammer's M. I. Hand 45%

Lanterns—Tubular—
Regular, No. 0 .... doz. $4.00@4.50
Side Lift, No. 0 .... doz. $4.25@4.75
Hinge Globe, No. 0. doz. $4.25@4.75
Other Styles ..... 40&5%

Bull's Eye Police—
8-inch ..... $3.75@4.00

Latches—Thumb—
Roggin's Latches, Jap'd, with Screws ..... doz. 35@40¢

Door—
Cronk & Carrier Mfg. Co., No. 101, ₱ doz. $2.00
Richards' Bull Dog, Heavy, No. 125 ..... 50&5%
Richards' Trump, No. 127 ..... $1.50

Leaders, Cattle—
Small ..... doz. 50¢; large, 60¢
Covert Mfg. Co.:
Cotton, 45%; Hemp, 45%; Jute, 35%; Sisal, 20%.

Leathers, Pump—
See *Pumps—*

Lifters, Transom—
R. & E. 10%

Lines—

Wire Clothes, Nos.	*18*	*19*	*20*
100 feet	*$2.30*	*1.95*	*1.75*
75 feet	*1.95*	*1.65*	*1.59*

Samson Cordage Works:
Solid Braided Chalk, Nos. 0 to 3..40%
Solid Braided Masons' 30%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50, ₱ gr. 20%
Masons' Lines, Shade Cord, &c.: White Cotton, No. 3½, $1.50; No. 4, $2.00; No. 4½, $2.50; Colors, No. 3½, $1.75; No. 4, $2.25; No. 4½, $2.75; Linen, No. 3½, $2.50; No. 4, $3.50; No. 4½, $4.50 ..... 20%
Tent and Awning Lines: No. 5, White Cotton, $7.50; Drab Cotton, $8.50 ..... 20%
Clothes Lines, White Cotton: 50 ft., $2.75; 60 ft., $3.25; 70 ft., $3.75; 75 ft., $4.00; 80 ft., $4.25; 90 ft., $4.75; 100 ft., $5.25 ..... 20%
Turner & Stanton Co.:
Solid Braided Chalk, Masons' and Awning Lines 40%
Clothes Lines, White Cotton.... 20%
Shade Cord, Cotton or Linen.... 20%

Locks—Cabinet—
Cabinet Locks .... 33⅓@33⅓@5%

Door Locks, Latches, &c.—
NOTE.—Net Prices are very often made on these goods.
Reading Hardware Co. 40%
R. & E. Mfg. Co. 10%

Padlocks—
R. & E. Mfg. Co. Wrought Steel and Brass ..... 75&10%

Sash, &c.—
Ives' Patent:
Crescent 10%
Automatic Gravity Metal Sash, ₱ gro., $149.58 ..... 10%
Window Ventilating 10%
Pullman Patent Ventilating Lock..25%
Reading Sash Locks 40%
Taylor Mfg. Co., Perfect Ventilating, ₱ doz. ..... $0.75@$1.00

Machines—Boring—
Com. Upr't, without Augers, $2.00@2.25
Com. Angl'r, without Augers, $2.25@2.50
Ford Auger Bit Co. $22.00
Jennings', Nos. 1 and 4 ..... 25&7½%
Millers' Falls 5.75
Snell's, Upright, $2.65; Angular, $2.90
Swan's Improved ..... 10&10%

Corking—
Reisinger Invincible Hand Power... ₱ doz. $48.00

Fence—
Williams' Fence Machines....each, $5.50

Hoisting—
Moore's Anti-Friction Chain Hoist.30%
Moore's Hand Hoist, with Lock Brake 20%
Moore's Cyclone High Speed Chain Hoist 25%

Ice Cutting—
Chandler's 12½%

Washing
Boss Washing Machine Co.: Per doz.
Boss No. 1 ..... $57.00
Boss Rotary $57.00
Champion Rotary Banner No. 1..$57.00
Standard Champion No. 1 ..... $30.00
Standard Perfection $27.00
Cincinnati Square Western $33.00
Uneeda American, Round $33.00

Mallets—
Hickory ..... 45&5@50%
Lignumvitæ ..... 45&5@50%
Tinners' Hickory and Applewood ..... doz. 45&5@50%

Mangers, Stable—
Swett Iron Works 50%

Mats, Door—
Acme Flexible Steel 50%
Elastic Steel (W. G. Co.), new list.50%
Everlasting Flexible Steel 33⅓%

Mattocks—
See *Picks and Mattocks.*

Milk Cans—See *Cans, Milk.*

Mills, Coffee, &c.—
Enterprise Mfg. Co.:
Coffee ..... 20@25%
Shell and Corn ..... 25&10%
National list Jan. 1, 1902 ..... 30%
Parker's Columbia and Victoria..33⅓%
Parker's Box and Side ..... 50&10%
Swift, Lane Bros. Co. 30%

Motors, Water—
Divine's Red Devil 30%

$2.50	3.50	10.00	15.00	..... 33⅓%
No. 1	2	3	4	

Lippincott's:

No.	1	2	3	4	
	$2.50	3.50	10.00	15.00	..33⅓%

Pike Mfg. Co., Tool and Knife Grinding 33⅓%

Mowers, Lawn—
NOTE.—Net prices are generally quoted
Cheapest, 10-in., $2.00; advance 10c for each size.
Cheap, 10-in., $2.25; advance 15@ 20c for each size.
Better Grade, 10-in., $3.00; advance 25c for each size.

	12	14	16	18-in.
High Grade	*$4.50*	*4.75*	*5.00*	*5.25*

Continental 60%
Great American 70%
Great American Ball B'r'g, new list.70%
Quaker City 70%
Pennsylvania 60%
Pennsylvania, Jr., Ball Bearing 50&10&5%
Pennsylvania Golf 50%
Pennsylvania Horse ..... 33⅓&5%
Pennsylvania Pony ..... 40&5%

Nails—
Wire Nails and Brads, Miscellaneous ..... 85&5@85&10%
Cut and Wire. See *Trade Report.*
Hungarian, Finishing, Upholsterers', &c. See *Tacks.*

Horse—

Nos.	6	7	8	9	10	
Anchor	23	21	20	19	18	.. ₱ lb. net, 12¢
Coleman	13	12	12	11	11	net ₱ lb
New Haven..	23	21	20	19	18	.. ₱ lb. net, 12¢
Livingston	19	18	17	16	16	..... 10%
Western						₱ lb 8½¢

Jobbers' Special Brands, per lb. 9¢

Picture—

	1½	2	2½	3 in.
Brass Hd. gro.	*.45*	*.55*	*.60*	*.70*
Por. Head, gro.	*1.10*	*1.10*	*1.10*	

Upholsters—
Brass 30%
Plated ..... 30&10%

Nippers—
See *Pliers and Nippers.*

Nipples—
Standard Nipple Co.:
Wrought Pipe Nipples 80%

Nuts—*Blank or Tapped.*

Cold Punched:	*Off list.*
Square	*5.10¢*
Hexagon	*6.00¢*
Square, C., T. & R.	*5.80¢*
Hexagon, C., T. & R.	*6.60¢*
Hot Pressed:	Off list.
Square	*5.90¢*
Hexagon	*6.40¢*

Oakum—
Best ..... lb. 6½¢
U. S. Navy ..... lb. 6 ¢
Navy ..... lb. 5 ¢
Plumbers' Spun Oakum .. 2¾@3 ¢

Oil—
Pike Mfg. Co., Stonoil 40%

Oil Tanks—See *Tanks, Oil.*

Oilers—
Steel, Copper Plated ..... 75&10%
Chase or Paragon:
Brass and Copper ..... 50&10%
Zinc ..... 65&10@70%
Railroad ..... 60&10&10%
American Tube & Stamping Co.:
Spring Bottom Cans ..... 70@70&10%
Railroad Oilers, &c. ..... 60@60&10%
Hero Fruit Jar Co.:
Spring Bottom Cans ..... 70@70&10%
Railroad Oilers, etc. ..... 60@60&10%
Malleable Hammers' Improved, Nos. 11, 12 and 13, 10%; Old Pattern, Nos. 1, 2, 3, 4, 50%.
Maple City Mfg. Co.:
Spring Bottom Cans ..... 70@70&10%
Railroad Oilers, &c. ..... 60@60&10%

Openers—Packing Box—
Herculever, ₱ doz., $2 ..... 30%

Can Openers—
Per doz.
Sprague, Iron Handle .... 30@35¢
Sprague, Wood Handle ..... 40¢
Sardine Scissors ..... $1.75@3.00
Can and Bottle Openers, ₱ doz., net: Yankee, $0.75@$0.85; Little Gem, $0.50@$0.65; Nifty $0.75

Egg—
Hartigan Nickel Plate, ₱ doz., $2.00; Silver Plate, $4.00.

Packing—
Asbestos Packing, Wick and Rope, any quantity ..... 16@17¢

Rubber—
(Fair quality goods.)
Sheet, C. I ..... 11@12¢
Sheet, C. O. S ..... 11@12¢
Sheet, C. B. S ..... 12@13¢
Sheet, Pure Gum ..... 40@45¢
Sheet, Red ..... 40@50¢
Jenkins' '96, ₱ lb, 80¢ 25%

Miscellaneous—
American Packing .... lb. 7@10 ¢
Cotton Packing ..... lb. 16@25 ¢
Italian Packing ..... lb. 9@10¢
Jute ..... lb. 4@4¼¢
Russia Packing ..... lb. 9@10¢

Pails, Water, Well, &c.—
See *Buckets.*

Paint—
Dixon's Silica-Graphite, in 1 gal. pails and 5 gal. kegs, 25%; packages of larger size 20%

Pans—Dripping—
Standard List ..... 75&5@75&10%
Edwards, Royal Blue 75%

Fry—
Common Lipped:

Nos.	*1*	*2*	*3*	*4*	*5*
Per doz.	*$0.75*	*0.85*	*0.95*	*1.15*	*1.30*

Refrigerator, Galva.—

Inch	*12*	*14*	*16*	*18*
Per doz.	*$1.75*	*2.25*	*2.80*	*3.15*

Paper—Building Paper
Asbestos: lb.
Roll Board or Building Felt, 6 to 30 lb., per 100 sq. ft... 2½¢
Roll Board or Building Felt, 3-32 and ⅛ in., 45 to 60 lb., per 100 sq. ft ..... 3½¢
Mill Board, Sheet, 40 x 40 in., 1-32 to ½ in ..... 3½¢
Per roll.
Rosin Sized Sheathing: 500 sq. ft.
Light weight, 25 lbs. to roll, 48@58¢
Medium weight, 30 lbs. to roll, 56@70¢
Heavy weight, 40 lbs. to roll, 75@78¢
Black Water Proof Sheathing, 500 sq. ft., 1 ply, 65¢; 2 ply, 85¢; 3 ply, $1.10; 4 ply, $1.25.
Deafening Felt, 9, 6 and 4½ sq. ft. to lb., ton $54.50
Red Rope Roofing, 250 sq. ft. per roll $1.75

Tarred Paper—
1 ply (roll 400 sq. ft.), ton. $34.00@$38.00
2 ply, roll 108 sq. ft ..... 65¢
3 ply, roll 108 sq. ft ..... 88¢
Slater's Felt (roll 500 sq. ft.) .80¢

Sand Paper and Cloth—
Flint and Emery ..... 50&10%
Garnet Paper and Cloth 25%

Parers—Apple—
Goodell Co.:

Family Bay State	₱ doz. $15.00
Improved Bay State	₱ doz. $36.00
New Lightning	₱ doz. $7.00
Turn Table '98	₱ doz. $6.00
White Mountain	₱ doz. $5.00
Bonanza Improved	each $7.50
Dandy	each $10.00
Eureka Improved	each $20.00
New Century	each $20.00
Ranger	each $30.00

Livingston Nail Co.:
Daisy ..... ₱ doz. $4.00
Little Star ..... ₱ doz. $3.00
Rocking Table ..... ₱ doz. $6.20
Reading Hardware Co.:
Advance ..... ₱ doz. $4.00
Baldwin ..... ₱ doz. $4.00
Reading 72 ..... ₱ doz. $3.25
Reading 78 ..... ₱ doz. $6.25

Orange—
Goodell Co., Success ..... each $20.00

Potato—
Saratoga ..... ₱ doz. $7.00
White Mountain ..... ₱ doz. $6.00

Picks and Mattocks—
(List Jan., 1908.)
List ..... 75&10%
Cronk's Handled Garden Mattock, ₱ doz., $3.00 ..... 33⅓%

Pinking Irons—
See *Irons, Pinking.*

Pins, Escutcheon—
Brass ..... 50@50&10%
Iron, list Nov. 11, '85 .. 60@60&10%

Pipe, Cast Iron Soil—
Eastern Prices:
Standard, 2-6 in. ..... 68% } Extra 10 & 10&5%
Extra Heavy, 2-6 in. ..... 74% }
Fittings, Standard and Heavy 80¾%

Pipe, Merchant—
Carloads to Consumers:

	Steel. Blk.	Steel. Galv.	Iron. Blk.	Iron. Galv.
	%	%	%	%
⅛ and ¼ in.	} See Trade Report			
⅜ in.				
½ in.				
¾ to 6 in.				
7 to 12 in.				

Pipe, Vitrified Sewer—
Carload lots.
Standard Pipe and Fittings, 8 to 24 in., f.o.b. factory:
First-class 87%
Second-class 90%

Pipe, Stove—

	Per 100 joints. C. L.	L. C. L.
Edwards' Nested:		
5 in., Standard Blue	$6.25	$7.25
6 in., Standard Blue	6.75	7.75
7 in., Standard Blue	7.75	8.75
5 in., Royal Blue	7.00	8.00
6 in., Royal Blue	7.50	8.50
7 in., Royal Blue	8.50	9.50
Wheeling Corrugating Co.'s Nested:		
5 in., Uniform Color	$5.90	$6.90
6 in., Uniform Color	6.40	7.40
7 in., Uniform Color	7.40	8.40

Planes and Plane Irons—
Wood Planes—
Bench, first qual. ..... 30@30&5%
Bench, second qual. ..... 10@10&5%
Molding ..... 25@25&5%
Chapin-Stephens Co.:
Bench, First Quality 30%
Bench, Second Quality 40%
Molding and Miscellaneous 25%
Toy and German 30%
Union 60%

Iron Planes
Chaplin's Iron Planes 60%
Union 60%

Plane Irons—
Wood Bench Plane Irons, list Dec. 12, '06 ..... 25%
Buck Bros. 30%
Chapin-Stephens Co. 25%
Union 50%
L. & I. J. White ..... 20&5@25%

Planters, Corn, Hand—
Kohler's Eclipse ..... ₱ doz. $7.50

Plates—
Felloe ..... lb. 3¾@4¢
Avery Stamping Co.:
Standard Wrot. Steel Felloe Plates in 100 lb kegs, per 100 lb, ¾-in. to 1¼-in., $4.00 net; 1¼-in. to 2-in., inclusive, $3.75 net.

Steel Pipe Hook—
Never-Break ..... 75&10%

Pliers and Nippers
Button Pliers .... 75&5@75&10&5%
Gas Burners, per doz., 5 in., $1.25 @$1.30; 6 in., $1.45, $1.50.

Gas pipe..	7	8	10	12-in.
	$2.00	$2.25	$2.75	$3.50

Acme Nippers ..... 50&5%
Cronk & Carrier Mfg. Co.:
American Button 80%
Improved Button ..... 75&10%
Cronk's 60%
No. 80 Linemen's 50%
Stub's Pattern 45%
Combination and others 33⅓%
Elmore Tool Mfg. Co.:
Gas Pliers 70%
Wire and Cutting Pliers 75%
Heller's Farriers' Nippers, Pincers and Tools ..... 40&5@40&10&5%
P., S. & W. Tinners' Cutting Nippers 40%
Swedish Side, End and Diagonal Cutting Pliers 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%

Plumbs and Levels—
Chapin-Stephens Co.:
Plumbs and Levels ..... 30@30&10%
Chapin's Imp. Brass Cor. 40@40&10%
Pocket Levels ..... 30@30&10%
Extension Sights ..... 30@30&10%
Machinists' Levels ..... 40@40&10%
Disston & Sons:
Shafting Levels ..... 65&10%
Pocket Levels ..... 65&10%
Plumbs and Levels ..... 65&10%
Track Level and Gauge ..... 65&10%
Woods' Extension 33⅓%

Points, Glaziers'—
Bulk and 1-lb. papers .... lb. 9 ¢
½-lb. papers ..... lb. 9½¢
¼-lb. papers ..... lb. 10 ¢

Police Goods—
Manufacturers' Lists .. 25@25&5%
Lower's 25%

Polish—Metal, Etc—
Ladd Co.:
Putzade Liquid, ₱ gro., ½ pts., $12.00; 1 pts., $20.00; 1 qts., $40.00; ₱ doz., ½ gals., $6.35; 1 gals., $12.00.
Prestoline Liquid, No. 1 (½ pt.), ₱ doz., $3.00; No. 2 (1 qu.), $9.00.. 40%
Prestoline Paste 40%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₱ doz. 50¢; ₱ gro. $4.50; ½ lb boxes, ₱ doz. $1.25; 1 lb boxes, ₱ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₱ doz., $1.25.
Barkeepers' Friend Metal Polish, ₱ doz., $1.75.

Stove—
Black Eagle Benzine Paste, 5 lb cans, ₱ lb 10¢
Black Eagle, Liquid, ½ pt. cans, ₱ doz. 75¢
Black Jack Paste, ¾ lb cans, ₱ gr. $9.00
Black Kid Paste, 5 lb can....each, $0.65
Ladd's Black Beauty Liquid, per 100 tins $6.75
Joseph Dixon ₱ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ₱ lb. 8¢
Fireside ..... ₱ gr. $2.50
Gem, ₱ gr. $4.50 ..... 10%
Japanese ..... ₱ gr. $3.50
Jet Black ..... ₱ gr. $3.50
Peerless Iron Enamel, 10 oz. cans, ₱ doz. $1.50

Window Polish—
Benj. P. Forbes:
Glasbright, No. 2, gal pails, ₱ doz., $24.00; each, $2.50; 1 lb cans, each ..... 75¢
Glasbright Powder, bbls., ₱ lb..20¢

Poppers, Corn—
1 qt. Square..doz.$0.80; gro.$8.75
1 qt. Round..doz.$0.90; gro.$10.00
1½ qt. Square.doz.$1.20; gro..$12.00
2 qt. Square..doz.$1.50; gro..$15.00

Post Hole and Tree Augers and Diggers—
See also *Diggers, Post Hole, &c.*

Posts, Steel—
Steel Fence Posts, each, 6 ft., 46¢; 6½ ft., 48¢; 7 ft., 50¢.
Steel Hitching Posts ..... each $1.30

Potato Parers—
See *Parers, Potato.*

Pots, Glue—
Enameled 40%
Tinned ..... 30&10%

Powder—
Black Sporting:
Kegs (25 lb.)..$5.00@5.50
Half Kegs (12½ lb.), $2.75@3.00
Quarter Kegs (6¼ lb.), $1.50@1.65
Canisters, pounds... .25
Canisters, ½ pounds. .15
Canisters, ¼ pounds. .12
} Discount to the trade, 10%.
NOTE.—Prices vary according to territory.
King's Semi-Smokeless:
Keg (25 lb bulk) $6.50
Half Keg (12½ lb bulk) $3.50
Quarter Keg (6¼ lb bulk) $1.99
Case 24 (1 lb cans bulk) $8.50
Half case (1 lb cans bulk) $4.50

King's Smokeless:	Shot Gun.	Rifle.
Keg (25 lb bulk)	$12.00	$15.00
Half Keg (12½ lb bulk)	6.25	7.75
Quarter Keg (6¼ lb bulk)	3.25	4.00
Case 24 (1 lb cans bulk)	14.00	17.00
Half case 12 (1 lb c. bk)	7.25	8.75

Presses—
Fruit, Wine and Jelly—
Enterprise Mfg. Co. ..... 20@25%
Seal Presses—
Morrill's No. 1, ₱ doz., $20.00 ..... 50%

Pruning Hooks and Shears
See *Shears.*

Pullers, Nail, Etc.—
Cyclops 50%
Elmore Tool Mfg. Co.:
Drop Forged Tack Pullers 10%
Nail Pullers 40%
Miller's Falls, No. 3, ₱ doz., $12.00.. 33⅓&10%
Morrill's No. 1, Nail Puller, ₱ doz. $20.00 ..... 50%
Pearson No. 1, Cyclone Spike Puller, each $30.00 ..... 50%
The Scranton Co. Case Lots:
No. 2B (large) $5.50
No. 3B (small) $5.00
Smith & Hemenway Co.:
Diamond B 70%
Giant 50%
Staple Pullers, Utica and Davison 60%
Taylor Mfg. Co., Sampson Tack, ₱ doz. $0.40

Pulleys, Single Wheel—

Inch	1½	1¾	2	3
Awning or Tackle, doz.	$0.30	.45	.60	1.05
Hay Fork, Swivel or Solid Eye, doz., 4 in., $1.25; 5 in., $1.55				
Inch	2	2¼	2½	
Hot House, doz.	$0.65	.85	1.20	
Inch	1¼	1¼	1¾	2
Screw, doz.	$0.16	.19	.23	.30
Inch	1¾	2	2¼	2½
Side, doz.	$0.25	.40	.55	.60
Inch	1½	1¾	2	2½

Sash Pulleys—
Common Frame; Square or Round End, per doz., 1¾ and 2 in. ..... 17@20¢
Auger Mortise, no Face Plate, per doz., 1¾ and 2 in.. .20@21¢
Acme, No. 35, 1¾ in., 19¢; 2 in., 20½¢
American Pulley Co.:
Wrought Steel American Plain Axle ..... 50&10%
Wrought Steel, Eagle, ₱ doz. 1¾ in., 17¢; 2 in., 20¢; 2¼ in. ..... 37¢
Top Notch, Electrically Welded, Nos. 3 and 4, ₱ doz. ..... 19¢
Common Sense ..... ₱ doz. 20¢
Merit ₱ doz., 2¼ in. ..... 37¢
Fox-All-Steel, Nos. 3 and 7, 2 in. ₱ doz. 50%
Grand Rapids All Steel Noiseless..50%
Niagara, No. 25, 1¾ in., 19¢; 2 in. ..... 20½¢
No. 26 Troy..1¾ in., 14½¢; 2 in., 16½¢
Star, No. 26....1¾ in., 19¢; 2 in., 20½¢
Tackle Blocks—see Blocks.

Pumps—
Cistern 60%
Pitcher Spout ..... 75¢&10&5@80
Wood Pumps, Tubing, &c 50%
Barnes Dbl. Acting (low list) 50%
Barnes Pitcher Spout 80%
Contractors' Rubber Diaphragm, No. 2, B. & L. Block Co. $16.00
Daisy Spray Pump ..... ₱ doz. $6.50
Flint & Walling's Fast Mail Hand (low list) ..... 50&5%
Flint & Walling's Fast Mail (low list) ..... 50&5%
Flint & Walling's Tight Top Pitcher 80%
National Specialty Mfg. Co., Measuring, Nos. 2, $6.00; 3, $5.50 ..... 30%
Myers' Pumps (low list) } 50%
Myers' Power Pumps ..... }
Myers' Spray Pumps ..... }

Pump Leathers—
Plunger and Valve Leathers—Per gro.:

No.....	*1*	*2*	*3*	*4*
	$5.00	*6.00*	*7.00*	*8.00*

Cup Leathers—Per 100:

Inch....	*2½*	*3*	*3½*	*4*
	$5.00	*7.00*	*9.00*	*12.00*

} 30@30&5%

Punches—
Saddlers' or Drive, good, doz. 50@75¢
Spring, single tube, good quality $1.75
Revolving (5 tubes)....doz.$3.50
Bemis & Call Co.'s Cast St'l Drive. 50%
Elmore Tool Mfg. Co.:
Machinists' Center 40%
Tinners': Solid, 50%; Prick 50%
Morrill's Nos. 1AA, 1A, 1B, 1C, 1D, $15.00 ..... 50%
Hercules, 1 die, each $5.00 ..... 50%
Niagara Hollow Punches 10%
Niagara Solid Punches ..... 55&10%
Tinners' Hollow, P., S. & W. Co.. 40%
Tinners' Solid, P., S. & W. Co., ₱ doz., $1.44 ..... 40&10%

Rail—Barn Door, &c.—
Sliding Door, Painted Iron, 2½@2¾¢
Sliding Door, Wrought Brass, 1⅛ in., lb., 36¢ 30%
Cronk's:
Double Braced Steel Rail..₱ ft. 2¾ ¢
O. N. T. Rail ..... 2¾ ¢
Griffin's:
xxx, ₱ 100 ft., 1 x 3-16 in., $3.25; 1¼ x 3-16 in., $3.75.
Hinged Hanger, ₱ 100 ft., 1 x 3-16 in., $3.50; 1¼ x 3-16 in., $4.00.
Lane's:
Hinged Track, ₱ 100 ft. $3.45
O. N. T., ₱ 100 ft., 1 in., $3.12½; 1¼ in., $3.45; 1½ in., $4.00.
Standard, 1¼ in. ..... ₱ 100 ft. $4.00
Lawrence Bros.:
1 x 3-16 in., ₱ 100 ft., $7.50; 1¼ x 3-16 in., $8.75 ..... 55&7½%
Trolley, No. 301, ₱ ft. ..... 9¢
McKinney's:
Hinged Hanger Track, ₱ ft., 11¢ ..... 60&5%
1 x 3-16 Track ..... 55&7½%
Myers' Stayon Track ..... 60&5%
Richards Mfg. Co.:
Common, 1 x 3-16 in., $3.00; 1¼ x 3-16, $3.25; 1¼ x 3-16, $3.50.
Special Hinged Hanger Rail..60&10%
Lag Screw Rail, No. 65 ..... 50%
Gauge Trolley Track, ₱ ft., No. 31, 9¢; No. 32, 14¢; No. 33, 20¢.
No. 50 ..... 60&10%
Nos. 61, $3.00; 62, $3.25; 63, $3.50; 64, $4.00; 45, $3.25; 46, $3.50; 49, No. 1, $3.25; 49, No. 2, $3.50.

Rakes—
NOTE.—Many goods are sold at net prices.
American Fork & Hoe Co.:
Lawn, ₱ doz., No. 24, $2.50; No. 20 ..... $2.25
Cronk's:
Steel Garden: Champion, ₱ doz., 12-tooth, $3.75; 14-tooth, $4.00; 16-tooth, $4.25; Ideal, ₱ doz., 12-tooth, $3.00; 14-tooth, $3.30; 16-tooth, $3.60.
Victor, 12-tooth, $2.25; 14-teeth, $2.50; 16-tooth, $2.75.
Queen City Lawn, ₱ doz., 20 teeth, $2.85; 24, $3.00 ..... net
Anticlog Lawn, ₱ doz. $4.00
Malleable Garden ..... 70&10%
Ideal Steel Garden, ₱ doz., 12 teeth, $15.00; 14, $16.00; 16, $18.00 ..... 80%
Kohler's:
Jumbo Lawn, 36-tooth ... ₱ doz. $5.00
Lawn Queen, 20-tooth ... ₱ doz. $2.85
Lawn Queen, 24-tooth ... ₱ doz. $3.00
Paragon, 20-tooth ..... ₱ doz. $2.65
Paragon, 24-tooth ..... ₱ doz. $2.75
Steel Garden, 14-tooth ... ₱ doz. $2.40
Malleable Garden, 14-tooth, ₱ doz. $1.75@2.00

Rasps, Horse—
Disston's 75%
Heller Bros. ..... 70&5@70&10&5%
Liveright Bros.' Gold Medal. 70&10@75%
McCaffrey's American Standard ..... 60&10&5%
New Nicholson ..... 70&10@75%
See also Files.

Razors—
John Engstrom Swedish 65%
Sharp Shaver 60%
Fox Razors, ₱ doz., No. 42, $24.00; No. 44, $30.00; No. 62, Platina, $36.00. } DEF

Reels, Fishing—
Hendryx:
M 6, Q 6, A 6, B 6, M 9¼, M 16, Q 16, A 16, B 16, 4008, Rubber, Populo. Nickeled Populo 20%
Aluminum, German Silv., Bronze. 25%
1210 N, 124 N 20%
3004 N, 06 N, 6 RM, G 9 ..... 25%
4 N, 6 PN, 24 N, 26 PN 20%
2904 P, 33⅓%; 2904 PN., 33⅓%; 0924 N., 33⅓%; 92084 N., 33⅓%; 002904 PN., 33⅓%; 802 N., 33⅓%; 986 PN, 2904 N, 974 PN 25%
5009 PN, 5009 N 20%
Competitor, 102 P, 102 PN, 202 P, 202 PN, 102 PR, 202 PR 20%
304 P, 304 PN, 00304 P, 00304 PN. 33⅓%

Registers—*List July 1, 1903.*
Japanned, Electroplated and Bronzed 70%
White Porcelain Enamel.. 50&10%
Solid Brass or Bronze Metal. 40%

Revolvers—
Single Action ..... 95¢@$1.00
Double Action, except 44 cal. $2.00
Double Action, 44 caliber... $2.00
Automatic $4.00
Hammerless $4.50

Riddles, Hardware Grade
16 in.....per doz.$2.50@$2.75
17 in.....per doz.$2.75@$3.00
18 in.....per doz.$3.00@$3.25

Rings and Ringers—
Bull Rings—

	2	2½	3 inch.
Steel	$0.70	0.75	0.80 doz.
Copper	$1.10	1.25	1.65 doz.

Hog Rings and Ringers—
Hill's Rings, per gro. boxes, $4.60@$4.75; per doz. boxes, 40@45¢
Hill's Ringers, Gray Iron, doz., 55@65¢
Hill's Ringers, Malleable Iron, doz. 85@95¢
Blair's Rings..per gro.$5.50@$6.00
Blair's Ringers..per doz.65@70¢

Rivets—
Copper Rivets and Burrs.... 50%
Tinners' and Miscellaneous Rivets ..... 80@80&10%

Bifurcated and Tubular—
Assorted in Pasteboard Boxes.
Bifurcated, per dozen boxes, 50 count, 40@45¢; 100 count, 50@63¢.
Tubular, per doz. boxes, 50 count, 60@68¢; 100 count, $1.12@$1.26.

Rollers—
Cronk's Stay, No. 50 ..... $1.00
Cronk's Brinkerhoff No. 55, $0.60; No. 56, $0.75; No. 60 ..... $0.75
Lane's Stay 40%
Richards' Stay:
Handy Adj. and Reversible No. 53.75¢
O. K. Adj. and Reversible No. 58.50¢
Lag Screw, Nos. 55 and 57 ..... 50%
Underwriters', Nos. 59, 60 ..... 50%
Favorite, No. 54 ..... 60%

Rope—
Manila, 7-16 in. diam. and larger: Highest Grade..... lb. 8½@8¾¢
"Pure" ..... lb. 8¼@8½¢
Sisal, 7-16 in. diam. and larger: Pure ..... lb. 7@7¼¢
Sisal, Hay, Hide and Bale Ropes, Medium and Coarse: Pure ..... lb. 7¼@7½¢
Sisal, Tarred, Medium Lath Yarn: Pure ..... lb. 6¼@6½¢
Cotton Rope: Best, ¼-in. and larger. 16½@18¢
Medium, ¼-in. and larger. 15@16¢
Common, ¼-in. and larger..7½¢
In coils, ½¢ advance.
Jute Rope: Thread, No. 1, ¼-in. and up, lb. ..... 6@6½¢
Thread, No. 2, ¼-in. and up, lb. ..... 5½@6¢

Wire Rope—
Galvanized ..... 47½&2½%
Plain ..... 55&2½%

Ropes, Hammock—
Covert Mfg. Co.:
Jute, 35%; Sisal 20%

Rules
Boxwood ..... 60&5%
Ivory ..... 25&5%
Chapin-Stephens Co.:
Boxwood 60%
Flexifold 40%
Ivory ..... 25@25&10%
Miscellaneous ..... 50@50&10%
Stephens' Combination 55%
Stationers' ..... 50@50&10%
Keuffel & Esser Co.:
Folding, Wood ..... 35&10%
Folding, Steel ..... 33⅓&10%
Lufkin's Steel ..... 50&10%
Lufkin's Lumber ..... 50&10%
Upson Nut Co.:
Boxwood ..... 60@60&10%
Ivory ..... 35&10@35&10&10%

Sash Balances—
See *Balance, Sash.*
Sash Locks—See *Locks, Sash.*

Sash Weights—
See *Weights, Sash.*

Sausage Stuffers or Fillers
See *Stuffers or Fillers, Sausage.*

Saw Frames—
See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—
Atkins':
Circular 45%
Band ..... 50@50&10%
Butcher Saws 50%
Cross Cuts 35%
One-Man Cross Cut 40%
Narrow Cross Cut 50%
Hand, Rip and Panel ..... 35&5%
Miter Box and Compass 40%
Mulay, Mill and Drag 45%
Wood Saws ..... 10&10%
Chapin-Stephens Co.:
Turning Saws and Frames ..... 30@30&10%
Diamond Saw & Stamping Works:
Sterling Kitchen Saws ..... 30&10&10%
Disston's:
Circular, Solid and Ins'ted Tooth 50%
Band, 2 to 18 in. wide 60%
Band, ¼ to 1¾ 60%
Crosscuts 45%
Narrow Crosscuts 50%
Mulay, Mill and Drag 40%
Framed Woodsaws 25%
Woodsaw Blades 25%
Woodsaw Rods, Tinned 10%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 70, 77, 8 ..... 25%
Hand Saws, Nos. 7, 107, 107½, 3, 1, 0, 00, Combination 30%
Compass, Key Hole, &c. 25%
Hand Ice Saws 45%
Butcher Saws and Blades 30%
C. E. Jennings & Co.'s:
Back Saws 16⅔%
Butcher Saws ..... 25&7½%
Compass and Key Hole Saws ..... 33⅓&7½%
Framed Wood Saws ..... 25&7½%
Hand Saws 12½%
Wood Saw Blades ..... 33⅓&7½%
Millers Falls:
Butcher Saws ..... 15&10%
Star Saw Blades ..... 15&10%
Massachusetts Saw Works:
Victor Kitchen Saws ..... 40&10&50%
Butcher Saws Blades ..... 35@40%
Peace & Richardson's Hand Saws 30%
Simonds':
Circular Saws 45%
Crescent Ground Cross Cut Saws 30%
One-Man Cross Cuts ..... 40&10%
Gang Mill, Mulay and Drag Saws 45%
Band Saws 50%
Back Saws ..... 25@25&7½%
Butcher Saws ..... 35@35&7½%
Hand Saws ..... 25@25&7½%
Hand Saws, Bay State Brand 45%
Compass, Key Hole, &c. ..... 25@25&7½%
Wood Saws ..... 40&7½%
Wheeler, Madden & Clemson Mfg. Co.'s Cross Cut Saws 50%

Hack Saw Blades and Frames—
Atkins' Hack Saw Blades A A A 25%
Disston's:
Concave Blades 25%
Chromol Blades 35%
Hack Saw Frames 30%
Simonds, 25%; The Best, 35%; Culley 35%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180 ..... 40&7½%
Hack Saws, Nos. 175, 180, complete, 40&7½%
Goodell's Hack Saw Blades ..... 40&10%
Griffin's Hack Saw Frames ..... 35&5&10%
Griffin's Hack Saw Blades ..... 35&5&10%
Star Hack Saws and Blades ..... 15&10%
Sterling Hack Saw Blades ..... 30&10&5%
Sterling Hack Saw Frames ..... 30&10&10%
Sterling Power Hack Saw Machines, each, No. 1, $25.00; No. 2, $30.00 ..... 15%
Victor Hack Saw Blades 20%
Victor Hack Saw Frames 40%
Whitaker Mfg. Co.:
National Hand Blades, Hand Frames, Power Blades 40%

Scroll—
Barnes, No. 7, $15 ..... 25%
Barnes' Scroll Saw Blades 40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20 ..... 20%
Loëter, complete, $10.00 ..... 15&10%
Rogers, complete, $3.50 and $4.00 ..... 15&10%

Scales—
Union Platform, Plain ..... $2.10@2.20
Union Platform, Stpd ..... $2.20@2.30
Chatillon's:
Eureka 25%
Favorite 40%
Grocers' Trip Scales 50%
The Standard Portables 40%
The Standard R. R. and Wag- 40%

Scrapers—
Box, 1 Handle ..... doz. $1.85@2.10
Box, 2 Handle ..... doz. $2.35@2.50
Ship ... Light, $2.00; Heavy, $2.50
Chapin-Stephens Co., Box ..... 30@30&10%
Richards Mfg. Co., Foot 60%

Screws—Bench and Hand
Bench, Iron, doz., 1 in., $2.50@2.75; 1½, $3.00@3.25; 1¼, $3.50@3.75
Bench, Wood ..... 20@20&10%
Hand, Wood ... 70&10@70&10&10%
Chapin-Stephens Co., Hand ..... 70@70&10&2½%

Coach, Lag and Hand Rail—
Lag, Cone Point ..... 80&10%
Coach, Gimlet Point ..... 80&5%
Hand Rail ..... 70&10@75%

Jack Screws—
Standard List ..... 70&10@75%
Millers Falls ..... 50&10&10%
Swett Iron Works ..... 70@75%

Machine—
Cut Tread, Iron, Brass or Bronze:
Flat Head or Round Head, 50@50&10%
Fillister Head ..... 40@40&10%
Rolled Thread, F. H. or R. H., Iron ..... 75&10%
F. H. or R. H., Brass, Nos. 8 to 14 ..... 65&10%

Set and Cap—
Set (Iron) ..... 75&10&7½%
Set (Steel), net advance over Iron 25%
Sq. Hd. Cap ..... 70&10&7½%
Hex. Hd. Cap ..... 70&10&7½%
Rd. Hd. Cap ..... 50&7½%
Fillister Hd. Cap ..... 60&7½%

Wood—
List July 23, 1903.
Flat Head, Iron ..... 87½&5@..%
Round Head, Iron ..... 85&5@..%
Flat Head, Brass ..... 80&5@..%
Round Head, Brass ..... 77½&5@..%
Flat Head, Bronze ..... 75&5@..%
Round Head, Bronze ..... 72½&5@..%
Drive Screws ..... 87½&5@..%

Scroll Saws—
See *Saws, Scroll.*

Scythes—
Per doz.
Plain Grass, Cutting Edge Polished ..... $6.25@$6.50
Clipper, Bronzed Web ..... $6.50@$6.75
Solid Steel, Web and Backs Polished ..... $7.00@$7.25
Bush, Weed and Bramble, Painted ..... $6.50@$6.75
Grain, Painted, Cutting Edge Polished ..... $8.25@$8.50
Clipper Grain, Bronze Web. $8.50@$8.75

Seeders, Raisin—
Enterprise ..... 25@30%

Sets— Awl and Tool—
Fray's Tool Handles, Nos. 1, $12; 2, $16; 3, $12 ..... 50%
Millers Falls Adj. Tool Handles, No. 1, $12; No. 4, $12; No. 5, $18 ..... 20&10%

Garden Tool Sets—
American Fork & Hoe Co.:
Rake, Shovel and Hoe, ℔ doz. sets, No. 3 P F $7.25

Sets, Nail—
Octagon ..... gro. $3.50@3.75
Buck Bros. 27½%
Elmore Tool Mfg. Co. 30%
Mayhew's ..... ℔ gro. $9.00
Snell's Corrugated, Cup Pt. ..... 40&10%
Snell's Knurled, Cup Pt. ..... 40&10%
Victor Knurled, Cup Pt. ..... ℔ gro. $7.50

Rivet—
Regular list ..... 75@75&10%

Saw—
Atkin's:
Criterion 40%
Adjustable 40%
Disston's Star, Monarch and Triumph 30%
Giant Royal Cross Cut ..... ℔ doz. $7.50
Morrill's No. 1 ..... $15.00
Nos. 3 and 4, Cross Cut $20.60
No. 5, Mill $30.00
Nos. 10, 11, 95 ..... $15.60
No. 1 Old Style $10.00
Special $16.25
Royal, Hand ..... ℔ doz. $4.50
Seymour Smith & Son's 65%
Taintor Positive ..... ℔ doz. $6.75

Shaving—
Fox Shaving Sets, No. 30 ..... ℔ doz., net, $24.00
Smith & Hemenway Co.'s 75%

Sharpeners, Knife—
Pike Mfg. Co.:
Fast Cut Pocket Knife Hones, ℔ doz. $1.50
Mounted Kitchen Sand Stone, ℔ doz. $1.50
Natural Grit Carving Knife Hones, ℔ doz. $3.00
Quick Cut Emery Carving Knife Hones, ℔ doz. $1.50
Quick Edge Pocket Knife Hones, ℔ doz. $2.50
} 25 & 50

Skate—
Smith & Hemenway Co., Eureka 50%

Shaves, Spoke—
Iron ..... doz. $1.25
Wood ..... doz. $2.00
Chapin-Stephens Co. ..... 30@30&10%
Goodell's, ℔ doz. $9.00 ..... 15&10%
Seymour Smith & Son's 50%

Shears—
Cast Iron .. 7 8 9 in.
Best ... $16.00 18.00 20.00 gro.
Good ... $13.00 15.00 17.00 gro.
Cheap .. $5.00 6.00 7.00 gro.
Straight Trimmers, &c.:
Best quality Jap ..... 70&10&5%
Best Quality Nickel ..... 60&10&5%
Tailors' Shears ..... 40@40&10%
Acme Cast Shears ..... 40@40&5%
Columbian Cutlery Co.:
Sheep, 1900 list ..... 30&10&5%
Grass ..... 50&10%
Horse or Mule ..... 50&10%
W. H. Compton Shear Co.:
Japan Handles, Nickel Blades, Full Nickel ..... 60&10&5%
Heinisch's Tailor's Shears 10%
National Cutlery Co.'s Nickel Plated, 60&10%; Japan Handles ..... 70&10%
J. Wiss & Sons Co.:
Best Quality Jap'd ..... 60&10%
Best Quality Nickeled ..... 50&10%
Tailors' 25%

Tinners' Snips—
Steel Blades ..... 20&5@20&10%
Steel Laid Blades ..... 50&10%
Acme Cast Snips ..... 40@45&5%
W. H. Compton Shear Co., Forged Steel Handles 35%
Forged Handles, Steel Blades, Berlin 50%
Heinisch's Snips 40%
Jennings & Griffin Mfg. Co.'s 6½ to 10 in. ..... 33⅓&7½%
National Cutlery Co.'s Forged Steel 50%
Niagara Snips 40%
P. S. & W. Forged Handles, 25%; W. R. W. 50%
J. Wiss & Sons Co.:
Wiss Forged Steel 25%

Pruning Shears—
Columbian Cutlery Co.:
Hedge, Wilcut Brand ..... 60&10%
Lawn and Border, Wilcut Brand ..... 60&10%
W. H. Compton Shear Co., Dropped Forged Steel 35%
Cronk's Hand Shears 33⅓%
Cronk's Wood Handle Shears 33⅓%
Disston's Combined Pruning Hook and Saw, ℔ doz, $18.00 ..... 25%
Disston's Pruning Hook only, ℔ doz., $12.00 ..... 25%
J. T. Henry Mfg. Co.:
Pruning Shears, all grades 40%
P. S. & W. Co. ..... 40&10%
Seymour Smith & Son's:
Hand Shears 70%
Standard Tree Pruners ..... 75&10%
Wood Handle Pruning Shears 40%

Sheaves—Sliding Door—
Reading 40%
R. & E. list 15%

Sliding Shutter—
Reading list 40%
R. & E. list 15%

Shells—Shells, Empty—
Brass Shells, Empty:
Climax, 10 and 12 gauge ..... 60&5%
Club, Rival, 65&5%; First Quality, 60&5%
Paper Shells, Empty:
New Rapid, 10, 12, 16 and 20 gauge, 25&10%
Climax, 10 and 12 gauge; Acme and Magic, 10, 12, 16 and 20 gauge; Ideal, 10, 12, 16 and 20 gauge; Leader grade ..... 25&5%
Union, League, 10 and 12 gauge, Rival Grade 25%
New Climax, Defiance, 10, 12, 14, 16 and 20 gauge; Climax, 14, 16 and 20 gauge 20%
Challenge, Monarch, 10, 12, 16 and 20 gauge; League, Union, 14, 16 and 20 gauge; Repeater Grade 20%

Shells, Loaded—
Loaded with Black Powder 40%
Loaded with Smokeless Powder, medium grade ..... 40&5%
Loaded with Smokeless Powder, high grade ..... 40&10&10%
Union Metallic Cartridge Co.:
New Club, Black Powders 40%
Nitro Club, Smokeless Powders ..... 40&5%
Arrow, Smokeless Powders ..... 40&10&10%
Winchester:
Smokeless Repeater Grade ..... 40&5%
Smokeless Leader Grade ..... 40&10&10%
Black Powder 40%

Shingles, Metal— Per Sq.
Edwards Mfg. Co.:

	Painted.	Galv.
14 x 20	$4.25	$6.00
10 x 14	4.50	6.25
7 x 10	4.75	6.50

Wheeling Corrugating Co.:

Dixie, 14 x 20 in.	$4.05	$5.05
Dixie, 10 x 14 in.	4.25	5.45
Dixie, 7 x 10 in.	5.25	6.70

Shoes, Horse, Mule, &c.—
F.o.b. Pittsburgh:
Iron ..... per keg. $4.10
Steel ..... per keg. $3.85
Burden's, all sizes ..... ℔ keg $3.90

Shot—
25-lb. bag.
Drop, up to B $1.70
Drop, B and larger 1.95
Buck 1.95
Chilled 1.95
Dust 2.30

Shovels and Spades—
Association List ..... 40&7½%@40&10%
Avery Stamping Co. 40%

Snow Shovels—
Long Handle ..... $2.50@$2.75
Wood and Mall, D Handle, $2.65@$2.90

Sieves and Sifters—
Hunter's Imitation, gro $9.50
Hunter's Genuine, per gro .. $12.00

Sifters, Ash—
Acme Ball Bearing Sales Co., Acme Automatic Ash Sifter, each, $3.25; ℔ doz. $39.00

Sieves, Seamless Metallic
—Per dozen.—

Mesh	14	16	18	20
Iron Wire	$1.05	1.05	1.10	1.20
Tinned Wire	$1.15	1.15	1.20	1.30

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested ..... doz. $0.90@0.95
Mesh 20, Nested ..... doz. $1.00@1.05
Mesh 24, Nested ..... doz. $1.30@1.40

Sinks, Cast Iron—
Painted, Standard list:
12 x 12 to 22 x 36 in. 60%
20 x 24 to 24 x 50 in. 50%
24 x 60 to 24 x 120 in. 30%
Barnes' low list 60%
NOTE.—There is not entire uniformity in lists used by jobbers.

Skeins, Wagon—
Cast Iron ..... 70@70&10%
Steel ..... 35@40%

Slates, School—
Factory Shipments.
"D" Slates ..... 50@50&10%
Eureka, Unexcelled Noiseless .. 60&7 tens.
Victor A, Noiseless .. 60&5 tens &5%

Slaw Cutters—See *Cutters.*

Snaps, Harness—
German ..... 40@40&10%
Covert Mfg. Co.:
Derby, 25%; Yankee, 30&2%; Yankee Roller, 30&2%
High Grade, 40%; Trojan 40%
Jockey 25%

Snaths—
Grass Scythe ..... 50@50&5%

Snips, Tinners—See *Shears.*

Spoons and Forks—
Silver Plated—
Good Quality ..... 50&10@60&5%
Cheap ..... 60@60&10%
International Silver Co:
1847 Rogers Bros. ..... 40&10%
Rogers & Bro., William Rogers' Eagle Brand ..... 50&10%
Anchor, Rogers Brand 60%
Wm. Rogers & Son ..... 60&10%

Miscellaneous
German Silver ..... 60@60&5%

Tinned Iron—
Teas ..... per gro. 50@55¢
Tables ..... per gro. $0.90@$1.00
Atlas Mfg. Co.:
Tea Spoons, ℔ gro. ..... 50¢@55¢
Table Spoons, ℔ gro. ..... $0.90@$1.00

Springs— Door—
Bardsley's Spring and Check 40%
Chicago (Coil) ..... 40&10%
Gem (Coil) 20%
Pullman Door and Gate 10%
Reliance (Coil) ..... 40&10%
Star (Coil) 35%
Torrey's Rod, 39 in. ..... ℔ doz. $1.00

Carriage, Wagon, &c.—
1¼ in. and Wider: Per 100 lb.
Black ..... $4.75@$5.00
Half Bright ..... $4.75@$5.00
Bright ..... $5.25@$5.50
Painted Seat Springs:
1½ x 2 x 26 .... per pair. 45@47¢
1½ x 3 x 28 .... per pair. 68@71¢

Sprinklers, Lawn—
American Foundry & Mfg. Co.:
Cactus, 65%; Japanese, 70%; National, ℔ doz. $12.00
Enterprise ..... 25@30%
Hero Fruit Jar Co., ℔ doz. $4.50
Philadelphia No. 1, ℔ doz, $12; No. 2, $15; No. 3, $20 ..... 30%

Squares—
Nickel plated .. } List Jan. 5, 1900.
Steel and Iron. } 80@—%
Rosewood Hdl. Try Square and T-Bevels ..... 60&10&10&10%
Iron Hdl. Try Squares and T-Bevels ..... 40&10@40&10&10%
Disston's Try Squares and Bevels, 60&10%

Squeezers, Lemon
Wood, Porcelain Lined:
Cheap ..... doz. $1.00
Good Grade ..... doz. $1.25
Tinned Iron ..... doz. $0.75@1.00
Iron, Porcelain Lined ... doz. $1.75
Victor, ℔ gro. $9.00

Staples—
Barbed Blind ..... 85&5@85&10%
Electricians' ..... 80&10&10@85%
Fence Staples, Polished, $1.70; Galvanized $2.00
Poultry Netting Staples ..... per lb. 3¼@3½¢

Steels, Butchers'—
Dick's 30%
Foster Bros.' 30%

Steelyards— .... 30@30&10%

Stocks and Dies—
Blacksmiths' ..... 50@50&10%
Curtis Rev'ble Ratchet Die Stock 25%
Derby Screw Plates 25%
Green River 25%
Lightning Screw Plate 25%
Little Giant 25%
Reece's New Screw Plate 25%

Stoners, Cherry—
Enterprise ..... 25@30%

Stones, Axe—
Pike Mfg. Co., Axe Stones (all kinds) 33⅓%

Glass Cutters' Stones—
Pike Mfg. Co., Glass Cutters' Stones and Supplies 40%

Stones, Oil, &c.—
Pike Mfg. Co., 1907 list: ℔ lb.
Arkansas St., No. 1, 3 to 5½ in. $2.80
Arkansas St., No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1 ..... $4.00
Lily White Washita, 4 to 8 in. 60¢
Rosy Red Washita, 4 to 8 in. 60¢
Washita St., Extra, 4 to 8 in. 50¢
Washita St., No. 1, 4 to 8 in. 40¢
Washita St., No. 2, 4 to 8 in. 25¢
Lily White Slips ..... 90¢
Rosy Red Slips ..... 90¢
Washita Slips, Extra ..... 80¢
Washita Slips, No. 1 ..... 70¢
Washita Slips, No. 2 ..... 40¢
India Oil Stones (entire list) 33⅓%
Quickcut Emery and Corundum Oil Stone, Double Grit 40%
Quickcut Emery and Corundum Axe Stone, Double Grit 33⅓%
Quickcut Emery Rubbing Bricks 40%
Hindostan No. 1, R'g'lar, ℔ lb. 80¢
Hindostan No. 1, Small ..... ℔ lb. 10¢
Turkey Oil Stones, Extra, 5 to 8 in. ..... ℔ lb. 80¢
Queer Creek Stones, 4 to 8 in. 20¢
Queer Creek Slips ..... 40¢
Sand Stone ..... 6¢
} 33⅓%

Scythe Stones—

Pike Mfg. Co., 1907 list:
Black Diamond S. S. ℔ gro. $12.00
Lamoille S. S. ℔ gro. $11.00
White Mountain S. S. ℔ gro. $9.50
Green Mountain S. S. ℔ gro. $7.00
Extra Indian Pond S. S. ℔ gro. $8.00
No. 1 Indian Pond S. S. ℔ gro. $7.50
No. 2 Indian Pond S. S. ℔ gro. $5.00
Leader Red End S. S. ℔ gro. $5.00
Quick Cut Emery.... ℔ gro. $10.00
Pure Corundum..... ℔ gro. $18.00
Crescent $7.00
Emery Scythe Rifles, 2 Coat. $8.80
Emery Scythe Rifles, 3 Coat. $11.00
Emery Scythe Rifles, 4 Coat. $13.20
Balance of 1907 list 33⅓%.
Lectro (Artificial), ℔ gro., $12.00 33⅓%
$12.00 ..... 33⅓%
Lightning (Artificial), ℔ gro., $18.00 ..... 33⅓%

Stoppers, Bottle—

Victor Bottle Stoppers..... ℔ gro. $9.00

Stops—Bench—

Millers Falls..... 15&10%
Morrill's, ℔ doz., No. 1, $10.00.... 50%
Morrill's, No. 2, $12.50..... 50%
Seymour Smith & Son's..... 60%

Door—

Chapin-Stephens Co..... 50@40&10%

Plane—

Chapin-Stevens Co..... 20%

Straps—Box—

Acme Embossed, case lots...20&10&10%
Cary's Universal, case lots...20&10&10%

Stretchers, Carpet—

Cast Iron, Steel Points..doz. 55¢
All Steel Socket...doz. $2.00@2.25
Excelsior Stretcher and Tack Hammer Combined, ℔ doz., $6.00....20%

Stuffers, Sausage—

Enterprise Mfg. Co., Stuffers and Lard Presses..... 25@25&7½%
National Specialty Co., list Jan. 1, 1902 ..... 30&5%
P., S. & W. Co..... 40&10&5%

Sweepers, Carpet—

Goshen Sweeper Co.:	Per doz.
Gilt Edge	$27.00
Superfine	26.00
Majestic	24.00
Select, Nickeled	22.00

National Sweeper Co.:
National Queen, Nickeled..... $27.00
Martha Washington, Nickeled.. 25.00
Monarch, Japanned..... 20.00
Perpetual, Japanned..... 18.00
Streator Metal Stamping Co.:
Model E, Sanitaire..... $25.00
Eureka 15.00
Streator Majestic, Nickeled..... 24.00
Streator Conqueror, Japanned.. 22.00

NOTE.—Leading Manufacturers give the following rebates from list prices: 50c per dozen on three-dozen lots; $1 per dozen on five-dozen lots; $2 per dozen on ten dozen lots.

Tacks, Finishing Nails, &c.

American Carpet Tacks.90&25@—%
American Cut Tacks..90&25@—%
Swedes' Cut Tacks.L..90&30@—%
Swedes' Upholsterers'.90&35@—%
Gimp Tacks.....90&35@—%
Lace Tacks.....90&35@—%
Trimmers' Tacks....90&30@—%
Looking Glass Tacks.....65@—%
Bill Posters' and Railroad Tacks, 90&40@—%
Hungarian Nails.....80@—%
Finishing Nails.....70@—%
Trunk and Clout Nails.75&5@—%

NOTE.—The above prices are for Straight Weights.

Miscellaneous—

Double Pointed Tacks, 90&6 tens@—%
See also Nails, Wire.

Tanks, Oil and Gasoline—

Wilson & Friend Co.:

Gal.	Gasoline	Oil
30	$2.75	$3.00
60	$3.50	$4.00
110	$5.00	$5.75

Tapes, Measuring—

American Asses' Skin....50@—%
Patent Leather.....25@30&5%
Steel .....33⅓&5%
Chesterman's .....25@25&5%
Keuffel & Esser Co.:
Favorite, Ass Skin.....40&10@50%
Favorite, Duck and Leather..... 25&5@25&10%
Metallic and Steel, lower list, 35@35&5%; Pocket, 35@35&5%.
Lufkins:
Asses' Skin,.....40&10@50%
Metallic .....30@30&5%
Patent Bend, Leather...25&5@25&10%
Pocket .....40@40&5%
Steel .....33⅓@35%
Wiebusch & Hilger:
Chesterman's Metallic, No. 34L, etc. 25%
Chesterman's Steel, No. 1038L, etc. 35%

Teeth, Harrow—

Steel Harrow Teeth, plain or headed, ¾-inch and larger per 100 lb.....$2.55@$2.80

Thermometers—

Tin Case, Cabinet, Flange, Dairy, &c.....30@35%

Ties, Bale—Steel Wire—

Single Loop.....82½&10%
Monitor, Cross Head, &c.70&2½%

Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

Tire Benders, Upsetters, &c.

See *Benders and Upsetters, Tire.*

Tools—Coopers'—

L. & I. J. White..... 20@20&5%

Haying—

Myers' Hay Tools..... 50%

Ice Tools—

Gifford-Wood Co..... 15%

Miniature—

Smith & Hemenway Co.'s, Davidson, ℔ doz., Nickel Plated, $1.50; Gold Plated..... $2.00

Saw—

Atkins' Cross Cut Saw Tools....35&5%
Simond's Improved..... 33⅓%
Simonds' Crescent..... 50%

Ship—

L. & I. J. White..... 25%

Torches—

Hammers, Engine, ℔ doz..... $4.50

Transom Lifters—

See *Lifters, Transom.*

Traps—Fly—

Balloon, Globe or Acme, doz., $1.15@$1.25; gro.....$11.50@12.00
Harper, Champion or Paragon, doz., $1.25@1.40; gro. $13.00@13.50

Game—

Imitation Oneida.....75@10%
Newhouse ..... 50&5%
Hawley & Norton..... 65&10%
Victor ..... 75@75&10%
Oneida Community Jump..... 70&5%
Stop Thief..... 60%
Tree Trap..... 60%
Hector ..... 75@75&10%

Mouse and Rat—

Mouse, Wood, Choker, doz. holes, 12¢
Mouse, Round or Square Wire, doz. 85@90¢
Marty French Rat and Mouse Traps (Genuine), ℔ doz.:

	Crate lots.	Small lots.
No. 1, Rat.....	$11.50	$14.50
No. 3, Rat.....	$5.75	$6.50
No. 3½, Rat.....	$4.70	$5.25
No. 5, Mouse.....	$2.25	$3.00

Animal Trap Co.:
Out o' Sight, Mouse, ℔ doz.....$0.60
Out o' Sight, Rat, ℔ doz..... 1.20
Easy Set, Mouse, ℔ doz..... .35
Easy Set, Rat, ℔ doz..... .85
Out o' Sight Chockers, ℔ doz. holes ..... .12
Out o' Sight, Tin, 5-hole, ℔ doz. traps ..... .75

Trowels—

Disston Brick and Pointing..... 25%
Disston Plastering..... 20%
Disston " Standard Brand " and Garden Trowels..... 30%
Kohler's Steel Garden Trowels, ℔ gro., 5 in., $4.80; 6 in., $6.00.
Never-Break Forged Steel Garden Trowels, in bulk, net ℔ gro. $5.50
In 1 doz. boxes..... ℔ gro. $6.00
Woodrough & McFarlan Plastering.25%

Trucks, Warehouse, &c.—

B. & L. Block Co.:
New York Pattern..... 50&10%
Western Pattern..... 60&10%
Handy Trucks..... ℔ doz. $16.00
Grocery ..... ℔ doz $15.00
McKinney Trucks..... each, net $10.00
Model Stove Trucks..... ℔ doz $18.50

Tubs, Wash—

M'f'gr's list, price per gross.
No. 0 1 2 3
Galvanized..$67 $79 $91 $103 10&7½ &5&5%

Twine, Miscellaneous—

Flax Twine:
No. 9, ¼ and ½-lb. Balls..21@23¢
No. 12, ¼ and ½-lb. Balls..19@21¢
No. 18, ¼ and ½-lb. Balls..16@18¢
No. 24, ¼ and ½ -lb. Balls. 15½@17½¢
No. 36, ¼ and ½-lb. Balls..15@17¢
Chalk Line, Cotton ¼-lb. Balls ..... 24@29¢
Cotton Mops, 6, 9, 12 and 15 lb. to doz..... 8½@19¢
Cotton Wrapping, 5 Balls to lb., according to quality..13½@19¢
American 2-Ply Hemp, 1- and ½-lb. Balls..... 12½@18¢
American 3-Ply Hemp, 1-lb Balls ..... 13½@16¢
India, 2-Ply Hemp, 1½-lb. Balls, Balls (Spring Twine)... 7½@9¢
India 3-Ply Hemp, 1-lb. Balls 7½@9¢
India 2-Ply Hemp, 1½-lb. Balls, 7@8½¢
2, 3, 4 and 5-Ply Jute, 1½-lb. Balls ..... 9@11¢
Mason Line, Linen, ½-lb. Bls.17¢
No. 264 Mattress, ¼ and ½ lb. Balls, according to quality. 30@60¢
Wool, 3 to 6 ply....B 6¢; A 7½¢

Vises—

Solid Box..... 60@60&10%

Parallel—

Athol Machine Co.:
Simpson's Adjustable..... 40%
Standard 40%
Amateur 25%
Columbian Hdw. Co., 40&5%; 8½-in. 65%
Fisher & Norris Double Screw, each, Nos. 2, $10.50; 3, $16.00; 4, $20.50; 5, $27.00; 6, $32.00..... 15&10%
Fisher-Brooks Bench Vises, No. 0, $3.80; No. 1, $5.90; No. 2, $8.25; No. 3, $10.50; No. 4, $13.50....15&10%
Fulton Mach. & Vise Co.:
F. & R. Double Swivel Machinists' 40%
Star, Solid Jaw, Machinists'.....40%
Hollands':
Machinists' .....40@40&5%
Keystone .....65&5@70%
Lewis Tool Co.:
Adjustable Jaw..... 30%
Monarch, 50%; Solid Jaw..... 50%
Massey Vise Co.:
Clincher 40%
Parallel Bar..... 15%
Perfect, 15%; Lightning Grip..... 15%
Merrill's 25%
Millers Falls Oval Slide Pattern..60&10%
Parker's:
Victor, 20@25%; Regulars....20@25%
Vulcan's ..... 40@45%
Combination Pipe..... 55@60%
Prentiss ..... 20@25%
Rock Island..... 25%
Snediker's X. L..... 33⅓%
Stephens' 33⅓%

Saw Filers

Disston's D 3 Clamp and Guide, ℔ doz., $24.00, 30%; Clamps..... 30%
Perfection Saw Clamps, ℔ doz....$4.50
Reading 60%

Wood Workers—

Fulton Mach. & Vise Co.:
F. & R. Double Swivel Coachman's 40%
Star Solid Jaw Woodworkers'....60%
Massey Vise Co.:
Lightning Grip, 15%; Perfect....15%
Wyman & Gordon's Quick Action, 6 in., $6.00; 9 in., $7.00; 14 in., $8.00.

Miscellaneous—

Fulton Machine & Vise Co., Combination Pipe..... 70%
Holland's Combination Pipe..60@60&5%
Massey's Quick Action Pipe..... 40%
Parker's Combination Pipe:
87 Series, 60%; 187 Series, 60&5%; No. 870, 40%.
Rock Island Pipe..... 25%

Wads—*Price per M.*

B. E., 11 up..... 60¢
B. E., 9 and 10..... .70¢
B. E., 8..... .80¢
B. E., 7..... .80¢
P. E., 11 up.....$1.00
P. E., 9 and 10..... 1.25
P. E., 8..... 1.50
P. E., 7..... 1.50
Ely's B. E., 11 and larger.$1.70@1.75
Ely's P. E., 12 to 20....$3.00@3.25

Dis. 15%

Ware, Hollow—Cast Iron, Hollow—

Stove Hollow Ware:
Enameled .....45&10%
Ground .....50&5%
Plain or Unground.....60%
Country Hollow Ware, per 100 lbs .....$2.75@$3.00
White Enameled Ware:
Maslin Kettles.....65&10%
Covered Ware:
Tinned and Turned.....35&10%
Enameled .....45&10%
See also *Pots, Glue.*

Enameled—

Agate Nickel Steel Ware..... 33⅓%
El-an-ge ..... 60&10%
Iron Clad Ware..... 70&10%
Lava and Volcanic, Enameled..40&10%

Tea Kettles—

Galvanized Tea Kettles:

Inch 6	*7*	*8*	*9*
Each ..... 45¢	*50¢*	*55¢*	*65¢*

Steel Hollow Ware—

Avery Stamping Co.:
Never-Break Spiders and Griddles ..... 65&10%
Steel Kettles, Maslins Scotch Bowls, Tin'd..... 60%
Steel Stew Pans, Stew Pots, etc., Porcelained 50%
Cleveland Stamping & Tool Co.:
Solid Steel Spiders and Griddles ..... 65&5%
Solid Steel Kettles..... 60&5%

Warmers, Foot—

Pike Mfg. Co., Soapstone....40@40&10%

Washboards—

No.	℔ doz.
800—Brass King, Single Surface, Open Back.....	$2.80
862—White Hen, Spiral Grimp Glass	$3.35
964—Royal Blue Enamel, Single Surface, Ventilated Back.....	$3.35
172—Our Best, Single Zinc, Soap Drainer	$3.35
722—Soap Saver, Single Zinc, Iron Top	$3.35
100—Northern Queen, Single Zinc, Perforated, Open Back.....	$3.00
134—Universal, Single Zinc, Extra Family Size, Ventilated Back....	$2.80
760—Banner Globe, Single Zinc, Ventilated Back.....	$2.25
57—Peerless, Double Zinc, Spring Protector	$3.70
56—Red Cross, Double Zinc, Swing Protector	$3.60
17—North Star, Solid Zinc, Swing Protector	$3.60
797—Jewel, Single Zinc, Pail Size.	$1.25
St. Louis Washboard Co.	
Ben Hur, Brass, Open Back.....	$2.50
Brass Key, Open Back.....	$2.75

Washers—Leather, Axle—

Solid .....90@90&10%
Patent .....90@90&5%
Coil: ⅞ 1 1¼ 1¼ inch.
9¢ 10¢ 11¢ 14¢ per box.

Iron or Steel—

Size bolt.... 5-16 ⅜ ½ ⅝ ¾
Washers....$4.90 4.00 2.70 2.50 2.30

The above prices are based on $6.50 off list.

In lots less than one keg add ½¢ per lb.; 5-lb. boxes add ½¢ to list.

Avery Stamping Co.:
Standard, in 200 lb kegs, $6.00 ℔ 100 lb. discl.; in 100 lb kegs, add 10¢ net ℔ 100 lb; in 5 or 10 lb boxes, add 50¢ net ℔ 100 lb; in 1 lb boxes, add $1.00 net ℔ 100 lb.

Cast Washers—

Over ½-inch, barrel lots, per lb. 1½@1¾¢

Wedges—

Oil Finish.....lb., 2¼@2¾¢

Weights—Hitching—

Covert Mfg. Co..... 30&2%

Sash—

Per net ton.....$22.50@—

Wheels, Corundum and Emery—

Pike Mfg. Co., Corundum, 65%; Emery 75%

Well—

8-in., $2.00; 10-in., $2.30; 12-in., $3.00; 14-in., $3.45.

Wire and Wire Goods—

Bright and Annealed:
6 to 9.....72&10&7½%
10 to 18.....72½&10&10%
19 to 26.....75&10&12½%
27 to 36.....77½&7½%
Galvanized:
6 to 9.....72½&10%
10 to 14.....72½&10&5%
15 to 16.....72½&10&5%
17 to 18.....72½%
19 to 26.....70&5&2½%
27 to 36.....65&10&10%
Coppered:
6 to 9.....65&10&10%
10 to 14.....70&10&5%
15 to 18.....65&10&10%
19 to 26.....70&5&2½%
27 to 36.....72½&10&2½%
Tinned:
6 to 18.....67&10&10%
Brass.....75¾¢ lb., base
Copper.....1⅞/10¢ lb., base
Cast Steel Wire..... 50%

Spooled Wire—

Annealed and Tinned..75@75&10%
Brass and Copper....70@70&10%
Retailers' Assortments, per box, $1.90@$2.10
Wire Clothes Line. See Lines.
Wire Picture Cord, see Cord.

Bright Wire Goods—

Steel Wire Goods.....90&40%
Brass Wire Goods.....90&40%
Brass Cup and Shoulder Hooks, 85%

Wire Cloth and Netting—

Galvanized Poultry Netting, 80&10@80&10&5%
Screen Cloth, 12 Mesh, Per 100 sq. ft.; Painted, $1.35; Galvanized, $1.95; 1¼ Mesh, Bronze $6.50.
Standard Galv. Hardware Grade: 100 ft. rolls, 2½ to 48 in. wide, Per 100 sq. ft.
Nos. 2, 2½ and 3 Mesh....$2.75
Nos. 4 and 5 Mesh.....$3.00
No. 6 Mesh.....$3.25
Nos. 7 and 8 Mesh.....$3.75

Wire, Barb—See *Trade Report*

Wrenches—

Agricultural ....80&10@80&10&5%
Alligator or Crocodile.70&10@75%
Baxter Pattern S Wrenches, 70&5@70&10%
Drop Forged S.....45@45&5%
Acme ..... 60&10%
Alligator Pattern, 70%; Bull Dog..70%
Bemis & Call's:
Adjustable S, 40&5%; Adjustable 8 Pipe, 40&5%; Briggs Pattern, 40%; Combination Bright, 50%.
Steel Handle Nut..... 50&5%
Combination Black..... 50&5%
Merrick Pattern..... 50&5%
Boardman's 40%
Coes' Genuine Knife Hdl...40&10&5&5%
Coes' Genuine Steel Hdl...40&10&5&5%
Coes' Genuine Key Model..40&10&5&5%
Coes' Genuine Hammer Handle..... 40&10&5&5%
Coes' " Mechanics' "...40&10&10&5&5%
Donohue's Engineer..... 40&10%
Eagle 70%
Gem Pocket..... 30%
Hercules 70%
W. & B. Machinist:
Case lots..... 50&10%
Less than case lots..... 50%
W. & B. Railroad Special:
Case lots..... 50%
Less than case lots..... 40&10&5%
Solid Handles, P., S. & W. 50&10%; full cases..... 50&10&5%
Standard Nipple Mfg. Co.:
Duplex Chain..... 50%
Uwanta Wrench Co.:
Uwanta Special, Iron Handle.... 40&10&5%
Other Wrenches..... 50%
Vulcan and Agrippa Chain..... 50%
Whitaker Machinists'..... 50&10%
Wizard Adjustable Ratchet..... 50%

Fruit Jar—

Beni, P. Forbes, Triumph, ℔ gro.. $7.50; per doz..... $0.90

Wrought Goods—

Staple Hooks, &c., list March 17, '02.....90@—%

Zinc— (*Cask lots at mill.*)

Sheet.....per 100 lb., $6.75